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| Institution: University of Manchester |
| Unit of Assessment: 24a (Anthropology) |
| Title of case study: Improving Public Understanding of the Effects of Aircraft Noise |
| <p>1. Summary of the impact</p> <p>Research undertaken at the University of Manchester (UoM) considers the association between aircraft noise, human health and everyday life. In partnership with an eminent Japanese acoustic scientist, the issue of noise emanating out of the Kadena US airbase (Okinawa Island) and Tokyo Narita Airport was addressed through the creation of an innovative exhibition. The key impact is that local government officials in Japan used the exhibition to enhance their own and citizen groups' understanding of acoustic science. This has helped to breach a long-standing <i>impasse</i> in negotiations over aircraft noise, involving citizens, local authorities, the military and the private sector. In addition, the research has been utilised by the makers of a leading sound-monitoring device (<i>Nittobo</i>), and the multimedia exhibition has been displayed and discussed outside Japan.</p> |
| <p>2. Underpinning research</p> <p>The case is based on research undertaken at UoM (2006-present) by Dr Rupert Cox (Senior Lecturer in Visual Anthropology). This work took forward earlier research (1995-1999), undertaken by Japan's foremost acoustic scientist, Kozo Hiramatsu (Emeritus Professor, Kyoto University; UK President, Japan Society for the Promotion of Science). Hiramatsu's research had established a scientific basis for the negative effects of aircraft noise emanating from the Kadena US airbase.</p> <p>Background: The association between aircraft noise, human health and everyday life is keenly negotiated between aviation authorities and affected populations worldwide. However, negotiations are generally based on modelling, rather than through either an assessment of the daily experiences of living with aircraft noise, or the health effects that manifest when aircraft are not audibly present. <u>The socio-cultural basis of vulnerability to noise is absent from these data.</u> Cox's anthropological perspective addresses this gap, revealing the forms of social life that develop in response to daily noise. Via the playback of recordings during interviews with residents (who were involved in the original research) important vulnerability factors – links between psycho-somatic conditions, acoustic experience and the symbolic significance of aircraft – were established.</p> <p>The research redefined conventional paradigms and measuring mechanisms, by rendering categories of 'noise' in terms of daily 'lived experience' rather than through reference to a yearly average; this demonstrated how vulnerability factors are created by social and political relations. Converting noise data into forms of description – via the transplantation of sound environments into an immersive gallery installation – allowed the public to critically engage with these issues [A][D]. The research was operationalised through the mapping of acoustic data onto the 'descriptive media' of sound recordings, centring on a farm inside Narita airport. This involved the re-creation of an entire sound environment within a gallery installation, acting as a realistic surrogate for the acoustic laboratory. This demonstrates the inadequacies of the airport authorities' current measuring devices, which fail to monitor aspects such as the sound of planes on the ground. The translation of acoustic science data into descriptive and immersive multi-media (sound recordings and film) [B], revealed the following <u>insights</u>:</p> <ol style="list-style-type: none"> 1. Acoustic logic: A systematic method of description was provided that addressed absences in the WECPNL formula (weighted equivalent perceived noise level) used in Japan. This formula creates a mean average of the effects of noise over a year, but fails to account for the effects of 'everyday noise'. A breakthrough was achieved by adding critical detail to the conceptualisation of noise, showing its relationship to both individual experience and other sounds in the environment [A][C][D]. 2. Environmental monitoring: In Okinawa the research showed that the two different sound monitoring devices – the <i>Rion</i> type used by the Japanese government and the <i>Nittobo</i> type employed by local government and the citizens' groups seeking compensation – operate according to different acoustic logics, in effect capturing different sets of relationships between aircraft noise and everyday life [D]. The <i>Nittobo</i> picked up all sounds over a certain volume, revealing the position of aircraft noise in a shifting sound world. The <i>Rion</i> only monitored aircraft in flight, locating aircraft sound in an abstract system of air space. In Narita, findings were developed to show how the visual image of sound, offered by <i>Nittobo's</i> new sound |

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monitoring technologies, presented a perspective that could be linked back to the lived experience of the site [E].

3. **Categorical anomalies:** In both Narita and Kadena it was shown that for health and safety purposes what counts as 'noise' in the context of work carried out inside the airport/air base differs from what counts for those living outside its confines. For the latter, noise generated by airport activity at ground level (rather than in the air) was *not* being counted as 'noise' [A][C].
4. **Cultural associations:** In Okinawa the sound of over-flying US military aircraft was a vulnerability factor, stirring up traumatic memories of the Pacific war for locals, yet being described by US service personnel inside the base in triumphal terms, such as 'the sound of freedom'. In Narita, for those living inside or near the airport the noise of planes echoed a forty year history of protest against the airport, and of forced evictions by its authorities [A][C].

3. References to the research (all references available upon request - AUR)

Outputs were supported by peer-reviewed grants: FCO Global Opportunities Fund (2006, £1,783); Japan Society for the Promotion of Science (2007-12, £18K); Wellcome Trust (2010-11, £51K); British Academy (2009, £6,800). Output [C] is an art book and CD, published by the German label *Gruenrekorder*, specialists in audio field recordings/phonography/sound-art. The CD has been reviewed in *American Anthropologist* and three music journals (*Textura*, *Vital Weekly* and *ATTN*).

- [A] (2013) Cox, R. "Military Aircraft Noise and the Politics of Spatial Affect in Okinawa" in Stevens, C. & Hankins, J. (eds.) *Sound, Space and Sociality in Modern Japan* (London: Routledge) (AUR)
- [B] (2013) Cox, R. & Carlyle, A. "Sky-larks: An Exploration of a Collaboration Between Art, Anthropology and Science" in Schneider, A. & Wright, C. (eds.) *Anthropology and Art Practice* (London: Bloomsbury Academic) (AUR)
- [C] (2012) Carlyle, A. & Cox, R. *Air Pressure: Aircraft Noise and Perceptions of the Environment*. (Frankfurt: Gruenrekorder) (Exhibition submitted to REF 2014) (AUR)
- [D] (2012) Cox, R. & Hiramatsu, K. "Sounding Out Indigenous Identities in Okinawa Japan" in Hendry, J. & Fitznor, L. (eds.) *Anthropologists, Indigenous Scholars and the Research Endeavour: Seeking Bridges towards Mutual Respect* (REF 2014) (London: Routledge) (AUR)
- [E] (2010) Cox, R. 'The Sound of Freedom: US Military Aircraft Noise in Okinawa' *Anthropology News* – American Anthropology Association (December) (article on a collection of recordings made in and around the US airbase of Kadena, Okinawa. cf.: www.sensorystudies.org). doi: 10.1111/j.1556-3502.2010.51913.x

4. Details of the impact

Context: Standard methods for assessing aircraft noise fail to account for: firstly, the effects of noise exposure on the conduct of everyday life; secondly, the states of anxiety produced by the expectation of noise even when it is not strictly audible; and thirdly, the relationship of those sounds classified as noise with other sounds heard as part of the inhabiting of a particular environment. This research draws attention to the way acoustic data are produced and used in Japan, yet has wider applicability for other areas of the globe.

Pathways to Impact: Sound recordings were presented in a variety of formats. Firstly, a track from [C] was featured in a CD distributed with the avant-garde magazine *The Wire* (circ. ~30,000) [1]. Secondly, recordings were made available via the *Sensory Studies* website [2]. Thirdly, a short film was commissioned for the *Al Jazeera* programme 'People and Power' on the role of women in citizens' anti-base movements in Okinawa [3]. Finally, an art installation – 'Air Pressure: Aircraft Noise and Perceptions of the Environment' – was exhibited at the Whitworth Art Gallery (Manchester). The Guardian newspaper noted the exhibition's directness: "*Air Pressure creatively documents the cultural clash between the lifestyle of traditional farming and the turbulent thrills of international air travel. Focusing on two families who defiantly continue to farm at the end of Japan's Narita Airport runway... as an artwork, its audio-visual impact is more spectacularly immersive than academically informative. Dare I say it: the thrust and roar of planes can be uplifting after all*" [4]. The Whitworth run (November 2011 – February 2012) included a 'Japan Society for the Promotion of Science' (JSPS) symposium 'Risky Engagements: Encounters between Science, Art and Public Health' (5-6th January 2012), that included a two-hour open

session in the Gallery, attended by ~50 people who were able to make a direct connection between the immersive installation (and its related outputs) and the questions raised around the lack of accountability these scenarios often reveal. The symposium brought together Japanese public health scientists with anthropologists and artists from the UK. Discussion centred upon how art-science collaborations (and 'scientific communication') may be structured to affect 'bottom-up' policy change [5]. The seminar also included Japanese academics involved in the study of the impact of the Fukushima nuclear disaster. As the UK President, Japan Society for the Promotion of Science outlines: *"Through the conference the distinctive approach to the position of social science in the art-science interface that Air Pressure represented was made part of a discussion about the opening up in Japan of a new method of inquiry into environmental problems."* This has already led to concrete plans *"to develop this research method further in a multi-team member project across the Asia Pacific"* [6]. Soon afterwards, the sound film from the exhibition – 'Ki-atsu: The Sound of the Sky being Torn' [4] – was accepted for competition at: ISEA 2012 (one of 50 film works selected from 1500 entries); *Bideodromo* 2012 (one of 69 works selected from 467 films) and the IX Media Art Monographic Show 2013 (Colombia). It has also recently been accessioned into the permanent collection of the *Haus für Elektronische Künste* (Basel).

(1) Primary Impact: Local authorities in Japan have adopted new ways of promoting the public understanding of acoustic science, with a view to enhancing public debates on aircraft noise. In Japan, where the media report on aircraft noise as a matter of national interest, public meetings and events around aircraft noise have become nodal points in the formulation of aircraft operating policies, and have tested the evidential status of acoustic data in ways that directly inform legal cases. As the UK President, Japan Society for the Promotion of Science confirms, with reference to his own foundational research: *"this new way of presenting acoustic evidence, alongside personal testimony, has greatly assisted attempts to breach a long-standing impasse in negotiations over aircraft noise, involving citizens, local authorities, the military and the private sector"* [6]. In April 2013 the exhibition was shown in two locations and discussed at a public event held at the science centre in Nago city (5th April 2012), with Cox interviewed by *Ryukyu Shinpo* and the *Okinawa Times* – the latter quoting Cox's aim *"to express the context for the noise, and to use the power of art to explore whether it is damaging to everyday life"* [7].

Okinawa Museum of Art and History (Naha City): In Okinawa, a group of public officials led by the senior environmental health official, organised and provided payment for the installation to be exhibited, and facilitated newspaper interviews with Cox. The Head of the Prefectural Government's Department of Environmental and Community Affairs noted that the event: *"received the support of the Prefectural Government... A large number of people were able to experience aircraft noise through visual media, enabling them to gain a vicarious insight in to the way aircraft noise affects living conditions. This will help resolve issues of aircraft noise in the future... By expressing the aircraft noise that invades the farming community living in the vicinity of Narita Airport as an art film, viewers were able to familiarise themselves with the issues of aircraft noise. We hope that this experience will help inform the debate as we work to improve issues of aircraft noise from the US military bases in Okinawa"* [8]. Additionally, testimony from a member of the Okinawa epidemiological survey – a specialist in the psychology of disorders related to aircraft noise and the traumatic memories of the war in Okinawa – noted how visitors to the exhibition were able to appreciate the portrayal of the farmers' lives, and the use of the data-image from the *Nittobo* microphone, also remarking that: *"some people commented that they hadn't realised there were still people living like this in Narita... there were plenty of people who asked for a similar piece of art to be created from fieldwork at military bases like Kadena and Futenma"* [9]. The publicity surrounding the exhibition led to a visit to the exhibition by the Futenma district mayor, who asked that Cox and Hiramatsu use the method of combining sound measurements and audio-visual recordings to describe the effects of Osprey helicopters, operating out of the Futenma base.

Narita Bunka-kaikan (Cultural Hall): Narita City Council's educational division sponsored Cox's exhibition and distributed 8,000 leaflets about the installation to local schools. The leaflet connected the research behind the installation to on-going questions around the effects on public health of aircraft noise continuing until late at night, and it encouraged Narita residents to attend. The exhibition was covered in *Mainichi Shinbun* (morning circulation ~3.45million), which led to

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visits from the main players in the current debate – including the mayor of Narita city, anti-airport protestors and local farmers. Both the *Mainichi Shinbun* article and testimony from the Narita Prefecture Council note how the installation refocused the role of measurement techniques in estimating noise effects, away from their entrenchment of the political positions of the affected parties, and towards an appreciation of the environmental issues at stake [7][10]. The Narita city authorities have been in dispute with the community of farmers displaced by Narita airport for over forty years, and in the week of the exhibition the airport authority's decision to extend the night time flight curfew (from 11pm to 12pm) was being publically contested. The engagement of all parties with the research behind this exhibition has helped address this *impasse*. The Narita Prefecture Council officer responsible for monitoring relations between airport authorities, local residents and acoustic scientists for the last thirty years affirmed that: “many people were moved by the sincerity of the Shimamura family and their devotion to farming the land... I was pleased that there were a lot of people who travelled a long distance to see the film” [10].

Overall, these two exhibitions of ‘Air Pressure’ have demonstrated that the sponsoring officials used the installation to effect the following changes. Firstly, to extend and **re-interpret the scientific evidence** presented by acoustic scientists in public meetings and court proceedings over the last twenty years. Secondly, to improve the **accessibility of evidence** presented to varied publics (citizen groups, government officials, lawyers, judges, the media, etc.) Thirdly, to add **new and rigorously evidenced dimensions** to the ongoing assessment of the impact of aircraft noise.

(2) Secondary Impact: The methods developed through this research emerge from a social scientific interface between art and acoustic science, and have had an **impact on how sound data are understood in relation to noise pollution**. Crucially, this led to a fruitful working relationship with *Nittobo* – one of the two companies who manufacture the sound monitors used in Japan's domestic and military airports [D]. As the UK President, Japan Society for the Promotion of Science Research confirms: “The importance of the research was acknowledged by Nittobo, whose managing director asked permission to test a new prototype sound monitor in a position that we had identified on the site, where unmonitored noise from aircraft on the ground was felt most intensely by the local farmers” [6].

Whilst the research is of immediate consequence for the citizens of Narita and Kadena seeking to halt the extension of airport activity, it was also notable that the **research methods utilised have a universal applicability**. Exhibiting ‘Air Pressure’ at the 2012 ISEA festival (Albuquerque) – one of the world's oldest and most prestigious electronic arts festivals – substantiated the significance of the methods employed, and their public value. The exhibition stood out as an alternative to the sustainability discourses that commonly shape narratives around mechanical technologies and their environmental effects. The location of the festival allowed the work on Narita to be brought into dialogue with similar projects, such as one that dealt with the problems of aircraft noise in Tucson, Arizona. General acclaim led to ‘Air Pressure’ being displayed at the Albuquerque Museum of Art and History for an additional four months (November 2012 - February 2013).

5. Sources to corroborate the impact (all claims referenced in the text)

- [1] (2011) ‘Three Toho Scenes’ on *The Wire Tapper* 26 (cover CD, issued with *The Wire* magazine 330, August)
- [2] ‘Pencil of the Sun: tracking the reverberations of military aircraft noise in Okinawa, Japan’
- [3] (2008) ‘Okinawa: Island of Protest’ (broadcast on *Al Jazeera*, 22nd November)
- [4] (2011) *The Guardian* ‘This Week’s Exhibitions’ (5th November); Ki-atsu on Vimeo
- [5] JSPS London Newsletters #31 (2011) (p.8) & #32 (2012) (pp. 3-6)
- [6] Testimonial & Summary/Letters of Intent from UK President, Japan Society for the Promotion of Science (11th October 2013; November 2012)
- [7] (2013) Japanese Press Coverage: *Mainichi Shinbun* (6th April); *Okinawa Times* (8th April 2013); *Ryukyu Shimpo* (11th April & 2nd May)
- [8] Testimonial from Head of Department of Environmental and Community Affairs, Okinawa Prefectural Government (14th June 2013)
- [9] Testimonial from Member of Okinawa Epidemiological Survey (13th June 2013)
- [10] Testimonial from Council officer, Narita Prefecture (16th June 2013)