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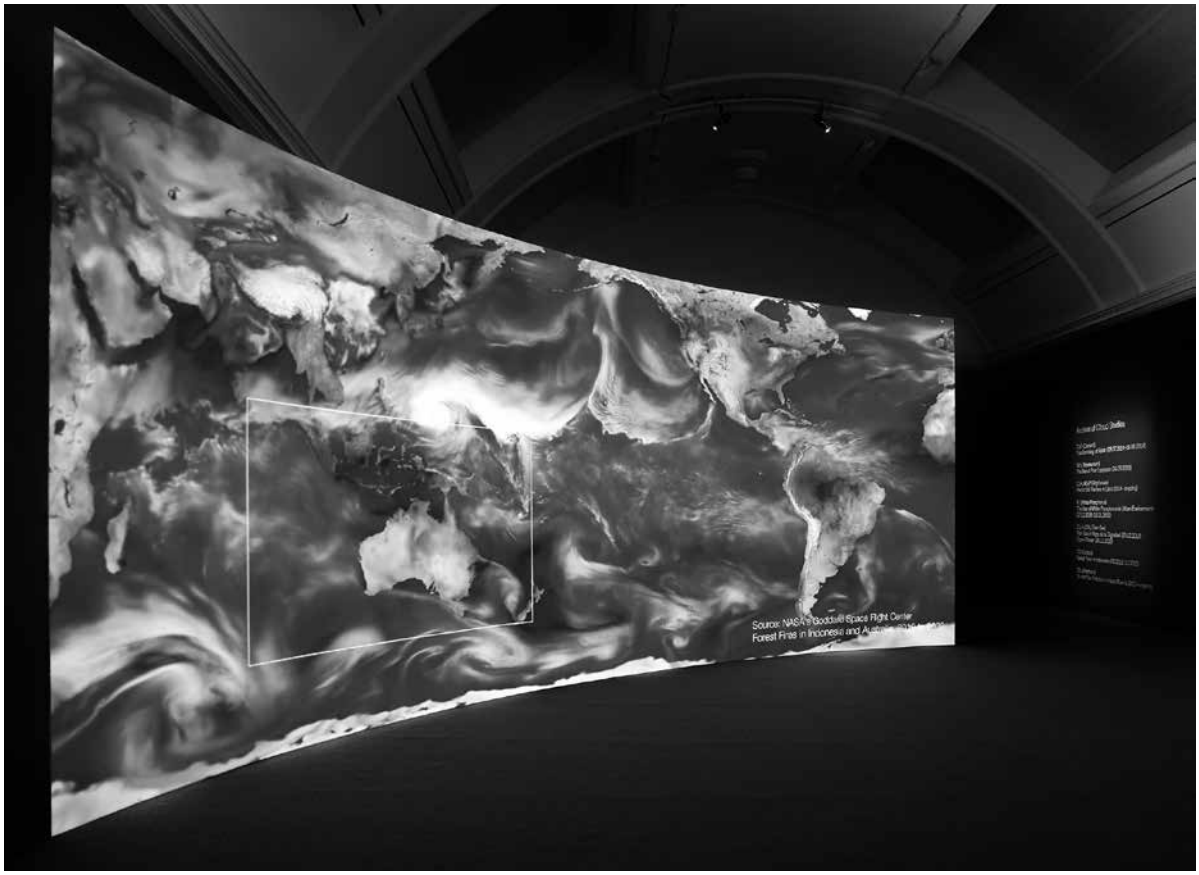
Cataloguing the work of an architectural detective agency

Political art practice, grounded in technical thought

On Cloud Studies

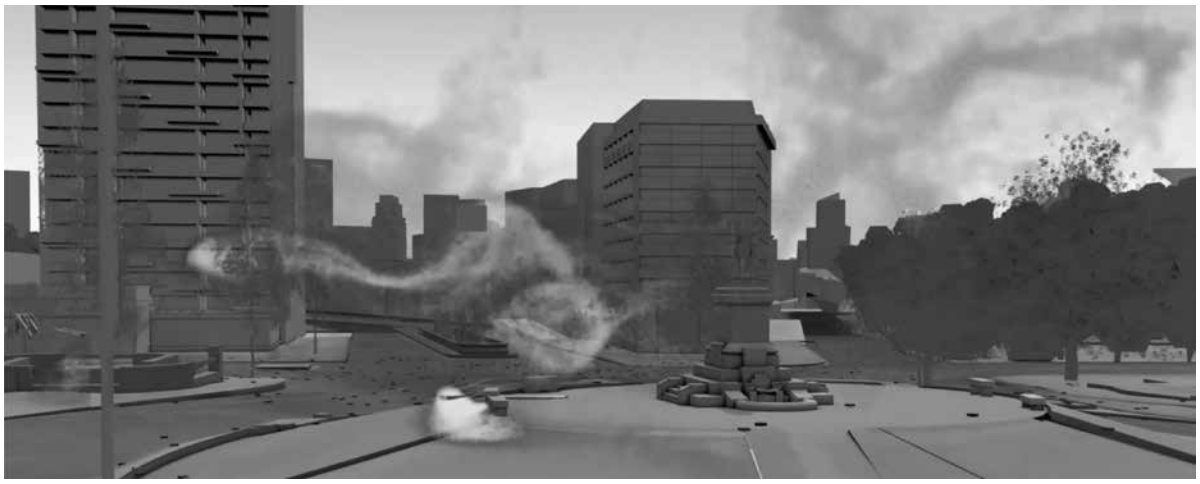
Fadi Shayya and Stephen Walker

Suspend your disbelief for a second, and ask yourself: what is *architectural* about clouds? For many researchers, practitioners and students of the field, a concern with the architectural is a concern with stable forms, organised layouts, inert materials, and recognisable cultural expressions. Yet in recent decades, relational and process-oriented approaches to analysing 'the social' have advanced architectural concerns with intensities of human and non-human flows, regulating energy exchanges and microclimatic *milieux*, and territorialising space through built enclosures and envelopes. The notion of *flows* in architecture is not only a philosophical category but a practical and programmatic one. This is how the idea of the Anthropocene has emerged as a framework for understanding the impacts of humans' extractive and construction activities on the Earth's climate. It is what put Sick Building Syndrome on health and well-being agendas. And this is why ventilation and air conditioning are at the forefront of a reconfigured intra- or post-coronavirus world.



1 Colour-coded imaging of aerosol distribution during the 2019–20 Forest Fires in Indonesia and Australia, as projected at the Whitworth. The original imaging was captured by the MODIS instrument (Moderate Resolution Imaging Spectroradiometer) aboard the Terra and Aqua satellites while data was processed and assimilated by the GEOS model (Goddard Earth Observing System) at the NASA Goddard Space Flight Center.

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2 A 3D model of the Plaza de la Dignidad, Chile, visualising the space, time, and movement of invisible toxins in discharge clouds from tear gas canisters used against protestors in 2019.

Rather than concerning stable states and inert matter, the architectural here becomes an associational methodology for facilitating or denying human gatherings by modulating flows and delineating accessible and inaccessible territories. Clouds can perform such associations 'of an architectural character': to modulate flows, regulate *milieux*, and territorialise space – only without walls, and with varying degrees of fuzziness, temporariness – and, indeed, lethality.[1]

This is how the research agency Forensic Architecture (FA) renders clouds architectural, and what their latest exhibition 'Cloud Studies' recounts. In FA's investigations exhibited here, smoke dims the sunlight and pollutes the air across entire urban areas (such as nineteenth-century European cities and Indonesian islands). Toxic aerosols significantly increase the risk of cancer across vast regions (the Mississippi River, the Palestinian territories). And tear gas creates no-trespass territories along borders and fringes (Gaza, Santiago). The thicker the smoke, the more our visibility is reduced. But as Cloud Studies demonstrates, there are other, invisible clouds that should also demand our attention *[1, 2]*. The longer their chemical decomposition, the longer the mutations and suffering. The greater their toxicity, the higher the numbers of casualties and fatalities.

Such architectural associations are present throughout Cloud Studies, made visible and perceptible through FA's advanced digital architectural and urban research methodologies. These include: mapping to timelines and timestamps of images harvested from online news reporting and social media; comparative perspectival analysis to geolocate events; the production of 'image-data complexes' to reconfigure still images, video, and audio data into a digital architectural model; and 3D digital modelling to reconstruct and make tangible what was previously not visible. A distinctive mundane architectural expression, amidst the vast computational algorithms and digital visualisations that characterise the exhibition, comes from one obscure artefact: a foam model showing the morphology of smoke plumes resulting from the aerial bombardment of the Al Tannur neighborhood in Rafah *[3* – seen on the right of the figure atop a small display stand*]*. Frozen in time-space and reconstructed according to FA's 'image-data complex' method, the toxic smoke plume model takes on an architectural persona that territorialises the landscape of dispersed cubes representing more familiar building forms that define the urban fabric of the neighbourhood. The model almost erases the ethical thresholds of representation, seemingly confusing the deadly militarised smoke plume with a strange futurist architectural proposition. This enacts a doubling that is introduced and frequently referred to in the exhibition – and put under some conceptual pressure – a double history that haunts any study of clouds, seeing them from the outside, as measurable objects, and experiencing them from within, as immersive environments.

This architectural conception of clouds as time-space-forming territorial agents extends a socio-philosophical notion of 'atmospheric consciousness'[2] – where the atmospheric becomes a medium that could be controlled, such as in the case of chemical warfare. There are no buildings, no structures, no material envelopes in the empirical cases of Cloud Studies, only the toxic dust of cement, white phosphorus, tear gas, methane, carbon monoxide, petrochemicals and herbicides, among others. This provides a stark contrast to more familiar atmosphere-architectures, ranging from the highly-regulated microclimates of corporate architecture and associated concerns about Sick Building Syndrome,[3] to the regulated micro-ecologies of Biosphere II,[4] to more playful works like Diller and Scofidio's Blur Building, which comprised a cloud of fine mist created 'through 35,000 high-pressure nozzles [and a] smart weather system [that] reads the shifting climatic conditions of temperature, humidity, wind speed and direction and regulates water pressure at a variety of zones'.[5] By rendering clouds architectural, FA's Cloud Studies show frames new questions for architectural research and practice in the era of Climate Change and the Anthropocene.

Cloud Studies and Forensic Architecture

The 'Cloud Studies' exhibition was commissioned and produced by The Whitworth (University of Manchester) and Manchester International Festival. It is a significant iteration of FA's show of the same name that was exhibited

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in autumn 2020 at the UTS Gallery in Sydney, understood as a part of a self-reflexive process where clouds have provided a framework to retrospectively position FA's broader portfolio of investigations. The rationale for thinking with clouds is emphasised, and the cataloguing system developed establishes connections between disparate projects.

Cloud Studies is presented as a techno-legal visual investigative journalism project based on nine investigations from FA's extensive archive. These include *The Use of White Phosphorous in Urban Environments* (2012); *The Bombing of Rafah* (2015); *Triple-Chaser* (2019); *Herbicidal Warfare in Gaza* (2019); *Oil and Gas pollution in Vaca Muerta* (2019); *The Beirut Port Explosion* (2020); *Tear Gas in Plaza de la Dignidad* (2020); and *Intentional Fires in Papau* (2020), as well as the Manchester International Festival commission *Environmental Racism in Death Alley, Louisiana* (2021).

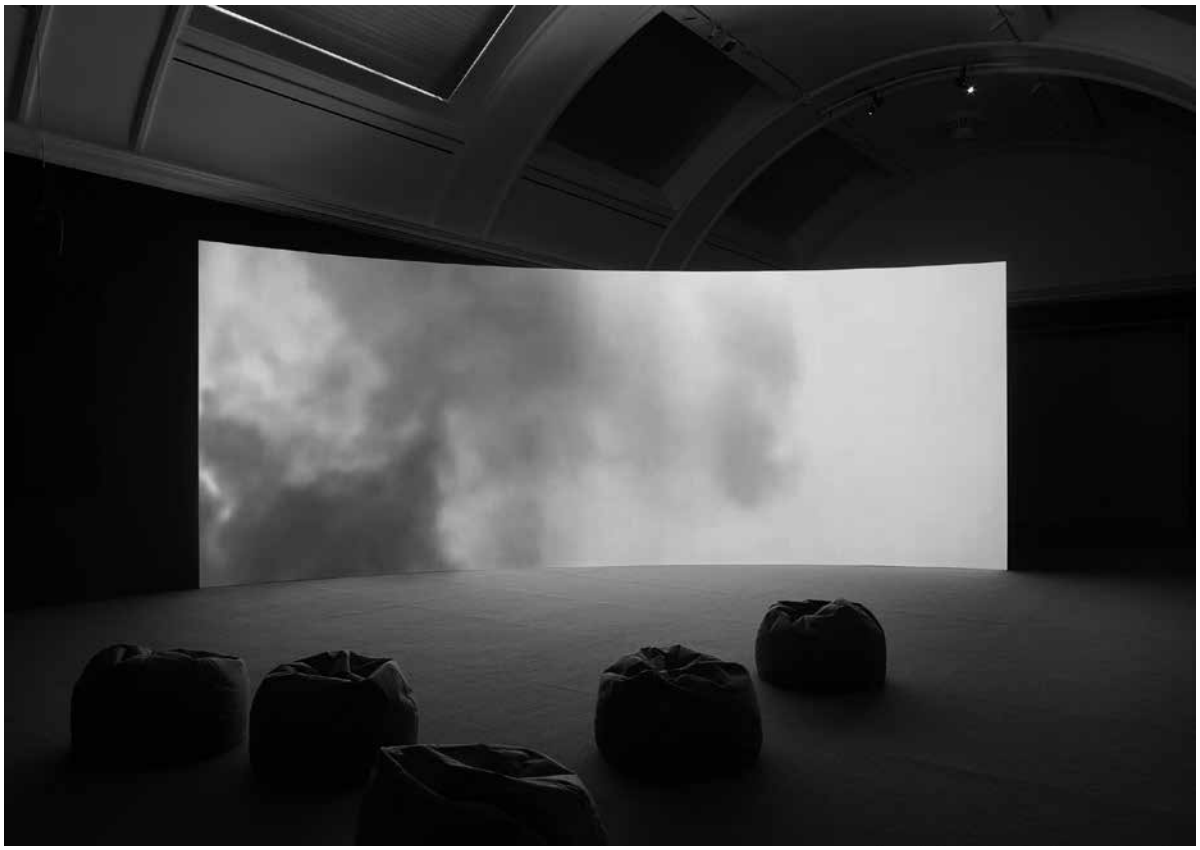
FA describes itself as an interdisciplinary research agency deploying art practices to intervene politically in the world through the lens of forensics.[6] It involves architects, artists, software developers, filmmakers, investigative journalists, scientists, and lawyers. It is based at Goldsmiths, University of London and is led by Eyal Weizman. For those unfamiliar with FA's work, their investigations take on cases concerning environmental and racial injustice and state-sponsored violence, usually in collaboration with local actors or activists. The casework ranges in scope from investigations of individual killings in domestic-scale spaces, to neighbourhood-scale events (bombings or the repression of protesting crowds), to regional and even global analysis concerning pollution, border policing, and the climate crisis. Across this range of scales and complexities, FA's investigative practice reinvents the digital 3D architectural model to reconstruct environments of injustice and violence by cross-referencing and triangulating relevant data, both spatially and temporally. Age-old architectural site-survey techniques – understanding sun paths, shadows, prevailing winds, urban morphology – are combined with photo, video, or audio content pertaining to events, satellite imagery and witness testimonies to build up evidential accounts of each specific case. Increasingly, these investigations pull in large clouds of data, harvested from the Internet, which are searched and analysed using complex algorithms and machine learning, and then synthesised in a digital 3D model. Some investigations have a longer historical frame, such as *Environmental Racism in Death Alley, Louisiana*, which combines fluid dynamic simulation analysis of contemporary windborne petrochemical pollution with historic analysis of colonial real-estate systems manifest in the development of sugar cane plantations along the Mississippi. One focus of this investigation – which uses cartographic regression that combines satellite imagery, aerial photographs, historic charts and surveys, archival photographs and plans – centres on locating historic cemeteries and burial sites of black slaves who were worked to death on the plantations, foregrounding the lack of recognition and status that these sites hold in contemporary industrial development planning.

The CS exhibition mobilises 3D



3 Multiple representations of the 2014 Israeli military bombing of Rafah, Palestine, as installed at the Whitworth. Digital data and computer-aided design furnish FA's methods to trace, synchronise, spatialise, and reconstruct the bombing event (left to right): geolocation (left), first-hand witness video from social media (middle), image complex and 3D modelling (right), composite spatial analysis (large), and model of smoke plume morphology of air-dropped bombs (bottom right).

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4 Clouds in HD from the 25-minute film based on FA's extensive archive, as projected at the Whitworth.

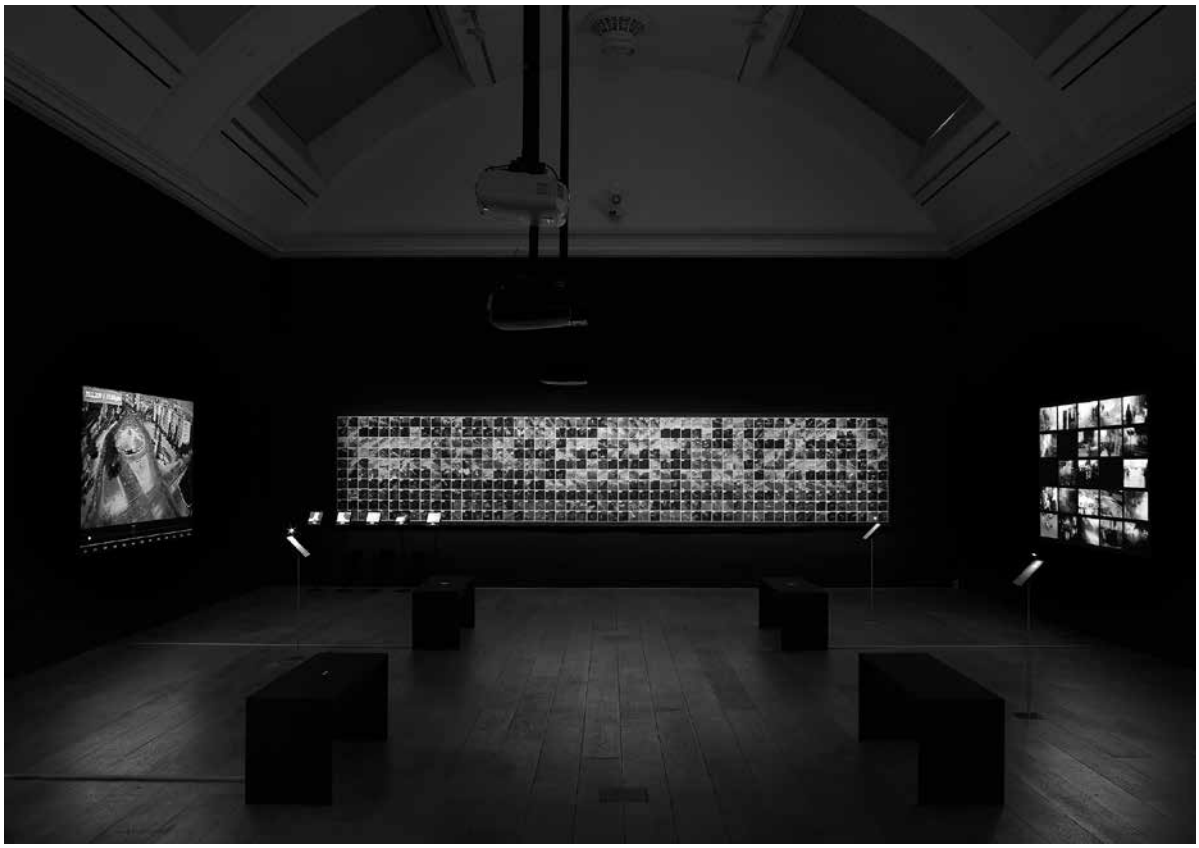
architectural models as the principal vehicle for their displays, frequently supplemented with other visual and textual evidence. Although the material could be viewed on a computer or tablet – indeed, QR code links are provided to web-based videos – there is undoubted benefit from taking this material in at scale, and the exhibition occupies the main temporary exhibition galleries at the Whitworth. The central room is given over to the largest possible HD projection, running a 25-minute film comprising short overviews of the above-mentioned projects, organised according to a chemical classification: CaO (Cement); P_4 (White Phosphorous); $C_3H_8NO_5P$ (Glyphosate); $C_{10}H_5ClN_2$ (Tear Gas), and so on *[4]*. Not only is this an effective way to organise the work but it also hints at connections between the individual projects, and beyond them to the wealth of further work available on the FA website. From this central space, two other galleries are accessed. One is given over to *Environmental Racism in Death Alley*. The other is a reading room, referred to as the 'Archive of Cloud Studies', containing more detailed contributions from all the projects included in the film *[5]*. Video, stills, audio explanations, physical models, and further narratives can be accessed here at one's own pace, followed up in-situ or elsewhere. In this combination of exhibition and exposition, the impact of the show comes from deadpan delivery and the overwhelming quantity of evidence and analysis. In each investigation, not only is a metanarrative told, numerous stories are told within it, and so are the stories of assembling the stories.

The main Cloud Studies show is prefaced with a separate introductory exhibit titled 'A Useful Pursuit of Shadows: A Response to Forensic Architecture's Cloud Studies Using the Whitworth Collection'. About a dozen works from the gallery's own collection – mainly oil paintings in a romantic or naturalistic style – welcome the visitor and situate the main exhibition, off-setting its high-tech aesthetic, providing a somewhat wider context for FA's studies. These works include depictions of storm clouds, fire clouds, nuclear clouds, industrial smoke, hydrochloric acid fumes, volcanic ash, and chlorine gas. They include the paintings of Van Ruisdael's *A Storm off the Dutch Coast* (c. 1660); Smith's *The Slave Trade* (1791); Constable's *Study of Clouds* (1821); Turner's *Sunset at Sea with Gurnets* (1838–40) and *A Conflagration, Regensburg, Germany* (1840); Rothwell's *Bolton from Blinkhorn's Chimney* (1848); Tidmarsh's *Cotton Mills* (1893–94); and Monnington's *Battle Area, 15,000 feet* (1943); photos of H. G. Wells and from the Imperial War Museum Collection; and studies from Howard (1804), Mulready (1840), and Ruskin (1860). This collection relates the fuzzy gaseous figures of natural and cultural clouds. It connects the historical anthropogenic pollution of colonisation, industry, and war through their cloud-like materialities, and it extends the morphological and scientific study of cloud figurations. The visitor learns that Turner developed techniques involving unusual materials to record fast-changing clouds from nature,[7] while Ruskin introduced perspectival grids to assist the accurate drawing of clouds.

Ways of seeing and witnessing, hyper-aesthetics

The exhibition's title can be understood as part-and-parcel of its aesthetics. It expands the category of clouds from the fluffy, floating bodies we see in the far sky (or, all-too-often in Manchester, experience as immersive environments!) to include an array

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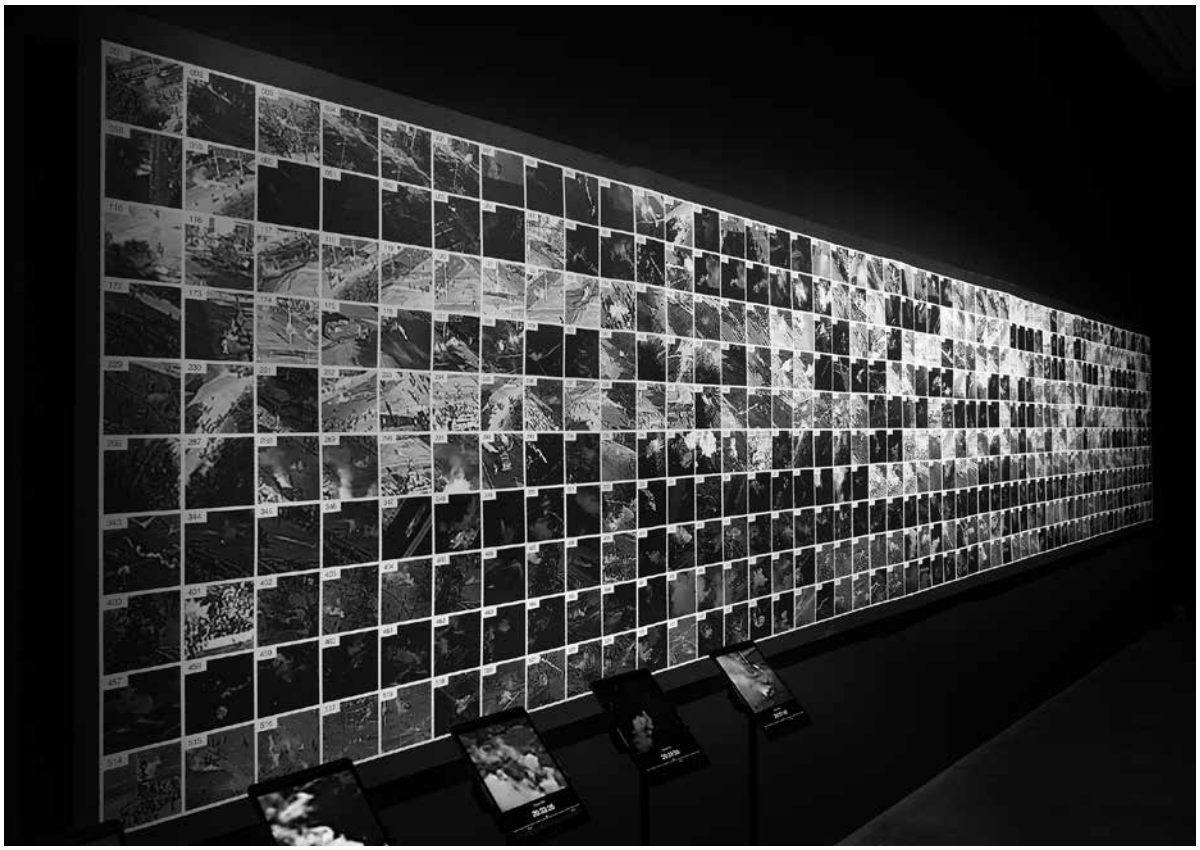
5 A 3D model of Beirut, Lebanon, visualising the morphology, colour, and toxicity of various smoke plumes resulting from the explosion of ammonium nitrates in 2020.

of rough and deadly aerosol-gaseous materialities that surround our immediate atmospheric environment and even penetrate the soil. Yet there is an uncanny tension in this aesthetic choice as the *cloud* classification rubs against categories like smoke, fumes, or aerosols. The given title seems more attractive than, say, Smoke Studies or Fume Studies, and yet this aesthetic choice serves to introduce interesting and complex questions about the politics of the curatorial process and its public dimension in relation to FA's evolving framework of architectural thought and practice.

At one remove from the evidence FA has submitted to international courts,[8] Cloud Studies deliberately proposes new ways of seeing (to borrow from John Berger) to a general public. The computer-generated models, mappings, animations, and simulations offer the observer an expanded view of what's inside the black box of injustice and violence by reconstructing versions of reality and reassembling a sensing and sense-making whose needs must move beyond discrete human corporeal capacities. Bringing this complex work to the public of an art gallery challenges the viewer's notions of seeing, questioning the politics of perception beyond the monolithic representations of mainstream media. Although 'whose gaze, and why?' remains a significant unaddressed question in such an exposition. This challenge is relevant to FA's primary mission: evidence-based accountability. Eyal Weizman expanded on the radical openness of this challenge in the artist talk organised by Manchester International Festival to accompany the show, arguing that to 'evidence is always to put something in question, evidence is never proof, evidence is a discussion'.[9] Thus, these *new ways of seeing* are also *new ways of witnessing*, where viewers form or revise their emotional, intellectual, and ideological stances through exposure to information *[6]*. Yet the exhibition – like many data-driven projects – risks becoming distanced from FA's mission for accountability in lieu of a hermetic environment of information overload.

Although there was no conventional exhibition catalogue, Matthew Fuller & Eyal Weizman's book *Investigative Aesthetics: Conflicts and Commons in the Politics of Truth* was published by Verso in 2021 around the time of the exhibition, providing an extended theoretical engagement with key issues. Fuller and Weizman argue the need to develop and understand 'hyper-aesthetics', which they advance as a techno-computationally augmented human sensorium, that links sensing and sense-making to relations of power, and which the investigations included in Cloud Studies clearly develop. In particular, the authors discuss the related state of 'hyperaesthesia' where sense perception gets radically overloaded. Indeed, visitors to the show are brought close to hyperaesthesia: deliberately pushed to the boundary of reason and the calculable thanks to the sheer volume of data communicated in the simultaneous micro-videos nested within each investigation summary video. This tactic risks losing the narrative of the project, making it *less* attuned to sensing – both as sensorial register and sense-making – and thus *less* attuned to the project of building conscious subjects.[10] Unlike a single FA video released online in response to a specific event – and unlike the open source methodologies, data, and software accessible to specialists from FA's website and GitHub – Cloud Studies risks becoming a data fetish platform that black boxes the investigation process, excluding the intended public audience from all but the final product.

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6 530 print frames and 5 video tablets showing the 2019 Chilean police's teargassing of protestors at the Plaza de la Dignidad, Chile, as installed at the Whitworth. Digital data, open-source intelligence, and advanced computing furnish FA's methods to trace the excessive use of 594 tear gas canisters and the consequent fluid dynamics of toxic air and particles in the neighbouring environment.

The exhibition simultaneously offers counter-readings to this criticism. *A Useful Pursuit of Shadows* suggests parallels with Enlightenment interest in the sublime experience, for example, which placed sense-making in abeyance when faced with the incalculable enormity of nature (seas, mountains, clouds were popular triggers). In the show, something of this orchestrated incomprehensibility is passed on in the staggering enormity of some of the stories being told and the sheer volume of data crunched in relation to them. In the clouds of data too there is perhaps a contemporary take on the sublime experience, encountered as we're moved inside and outside large datasets, sensing and making sense of them. Selim Rothwell's 1848 painting *Bolton from Blinkhorn's Chimney* depicts a bird's-eye view of the town's mill-dominated landscape from its famous 367 ft (112 m) chimney.[11] The Whitworth's label describes the polluting effects of the Blinkhorn Chemical Works and the legal action brought against it in the 1840s, proceeding to make a connection between the nineteenth-century situation in Bolton, Lancashire and the twentieth- and twenty-first-century situation in Death Alley, Louisiana.[12] The curatorial process extends the sublime experience in Rothwell's painting where the tall chimney allowed the painter to capture the vast landscape from an exceptional point of view. Once pulled back from such sublime incomprehension, when our feet are metaphorically back on the ground, additional interpretation of nineteenth-century pollution occurs in retrospect, looped back through projections from the current hyper-aesthetics furnished by FA's method.

This hyper-aesthetics aspires to build human consciousness, aiming to emancipate the individual and sometimes to strengthen the collective, such as when building a case against environmental racism in Louisiana.[13] This is art on a mission, an idealist approach conveying a tendency for fashioning a new enlightened subject: one with better sensing capacities and sense-making capabilities (albeit asking yet again 'whose gaze, and why?'). Another way to read this as art is through the lens of relational aesthetics,[14] where we see a structure depending on its interactions with the viewer rather than as a form enclosed onto itself. Whether the viewer understands (or not), or gets overwhelmed (or not), does not matter from this viewpoint, as this would all be part of the experience. Such idealist aspirations centre the analysis of technical thought in the exhibition and in *Investigative Aesthetics* around questions of access and power in relation to knowledge production. Arguably, FA's primary mode of operation is to democratise public access to data and its rigorous assembly into evidence, made available to the judiciary, human rights institutions, and indeed, affected communities. But these are different machines for accessing and processing information: the courts being modern top-down bureaucratic institutions that deal with evidence and litigation; where communities have other bottom-up organising methods and platforms. Cloud Studies says little about these other (primary) venues and audiences as it offers the viewer few clear and explicit insights into how their 'hyper-aesthetics' exert power in courtrooms or with communities.

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Technologies and technics, politics and clouds

Such idealist aspirations for technology raise other questions about how FA's technical objects (that is, computers, the Internet) render 'hyper-aesthetics' possible and integrate themselves into the world. This is what philosopher of technology Gilbert Simondon calls 'aesthetic activity'.[15] The smoke and smog of the nineteenth century can be understood as by-products of what Simondon periodises as a 'thermodynamic era', where factory machines were concerned with efficiency and located close to the sources of energy from coal. In contrast, the technics of twenty-first-century digital representations of clouds, smoke, fumes, and plumes are grounded in Simondon's 'electro-metallurgic era', where computational processing capacities – of personal computers and data centres – rely on the thermal resistance, voltage regulation and amplification of silicon-metal transistors. In other words, by paying some attention to 'aesthetic activity', 'hyper-aesthetics' can be understood to pose questions about technology, access, and power within an accentuated anthropocentric frame, relegating the technical objects that facilitate this thought as background artefacts. The high-tech mediation so evident in the Cloud Studies exhibition depends on billions of semi-conductors packed into each of the Integrated Circuit chips of FA's computers and the Internet's servers, which compute and visualise the data so we can make sense of it – or not. Cloud Studies does not invite the visitor to understand the type of computing power required to produce this art-forensic-evidence practice, leaving them feeling informed about violence but less conscious of the technical capacities that render such informing possible.

Eyal Weizman acknowledged the economics in FA's work of the relationship between art practice and the generation of forensic evidence for courtrooms in his talk, noting that FA would not be able to produce investigations without exhibition commissions. As a case in point, the new work shown here on environmental racism in Louisiana would not have been possible without the Manchester commission. This draws the location of the gallery into a network of institutional power. *Investigative Aesthetics* emphasises the importance of constantly querying the limits and politics of the fora of representation and their role in knowledge production. Cloud Studies hence provides a tangible reminder that geopolitics really is played out in galleries and institutions. Indeed, legal action taken by a pro-Israel coalition led to the temporary closure of the exhibition due to 'unforeseen circumstances'.[16] The coalition argued that FA's statement of solidarity with Palestine propagated anti-Semitism by falsely claiming that the State of Israel practices colonialism, apartheid, ethnic cleansing, and environmental racism. The statement had been posted next to the exhibition's main title board on the occasion of Israeli military operations against Gaza during May 2021. Soon after, the exhibition reopened, citing minor victories for artistic and academic freedom. FA's statement was returned, and the coalition's statement was added along with an institutional statement from the Whitworth.

The exhibition certainly raises more questions than it answers, and this is a productive quality of FA's work. For architectural researchers and practitioners, the exhibition shows how FA's practice blurs the propositional, speculative, and cybernetic characters of architecture, art, and information. This blurring is less about a poetic aesthetic and more about the figure of a complex political practice, grounded in contemporary technical thought. With what looks set to be increasing global destabilisation due to climate change and ecological crises, Cloud Studies shows that the *architectural* can become a methodological framework for associating humans, beyond designing buildings, drawn into modulating or denying flows and delineating accessible and inaccessible territories of atmospheric *milieux*.

'Cloud Studies', by Forensic Architecture was held at The Whitworth, Manchester, from 2 July to 17 October 2021.

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Stephen Walker is Professor and Head of Architecture at the University of Manchester. His research explores exchanges between architectural and art practice, and temporary architectures.

Notes

1. Albena Yaneva, 'The "Architectural" as a Type of Connector: A Realist Approach to Architecture', *Perspecta*, 42 (2010), 141–5 (p. 145).
2. After Peter Sloterdijk, *Terror from the Air*, trans. by A. Patton and S. Corcoran (Los Angeles, CA and Cambridge, MA: MIT Press (Semiotext(e) foreign agents series, 2009).
3. Michelle Murphy, *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers* (Durham, NC: Duke University Press, 2006).
4. Meredith Miller, 'Spheres, Domes, Limits, Interfaces: The Transgressive Architecture of Biosphere 2', in *Where Do You Stand. 99th ACSA Annual Meeting, March 3–6, 2011, Montréal, Canada*, ed. by Alberto Perez-Gomez, Annie Cormier, Annie Pedret (Washington, DC: ACSA Press 2011) <https://www.acsa-arch.org/chapter/spheres-domes-limites-interfaces-the-transgressive-architecture-of-biosphere-2/> [accessed 20 October 2021].
5. Diller Scofidio + Renfro, *Blur Building: Swiss Expo 2002, Yverdon-Les-Bains, Switzerland* <https://dsrny.com/project/blur-building> [accessed 20 October 2021]. Arguably DS+R's more recent *The Broad* in Los Angeles (2015) solidifies this approach in more familiar architectural materials.
6. Recently popularised as 'space detectives' by Elizabeth Fullerton: 'Political, Forensic, Hi-Tech: How "Research Architecture" is Redefining Art', *The Guardian*, 6 January 2019 <https://www.theguardian.com/artanddesign/2019/jan/06/research-architecture-redefining-art-goldsmiths-london> [accessed 1 November 2021]. Also as an 'architectural detective agency' in

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a Goldsmiths Press Release: '*Truth Has to Be Made Public in Order to Operate*' – *10 Years of Forensic Architecture*, *Goldsmiths, University of London* <https://www.gold.ac.uk/news/10-years-of-forensic-architecture/> [accessed 1 November 2021].

7. Tate's Turner Prize was, of course, named after J. M. W. Turner, to which Forensic Architecture was shortlisted in 2018.
8. It has made submissions '[...] to the International Criminal Court on Israel's 2014 assault on Gaza; to the Inter-American court on Guatemala's genocide; and to the European Court of Human Rights on Italy's role in migrant drowning deaths'. Fullerton, 'Political, Forensic, Hi-Tech'.
9. Artist Talks: Forensic Architecture in conversation with Alistair Hudson (featuring Eyal Weizman, Samaneh Moafi, Imani Jacqueline Brown), online video recording, YouTube (2 July 2021) <https://www.youtube.com/watch?v=mgZJaPLhZoY&t=16s> [accessed 29 November 2021].
10. Fuller and Weizman, *Investigative Aesthetics*, pp. 33–41.
11. Demolished in 1967, following two earlier shortenings. See Alan McEwen, *William Blinkhorn's Monster Chimney 'Little John' Bolton, Lancashire* (Sledgehammer Engineering Press Limited, 14 June 2019) <https://www.sledgehammerengineeringpress.co.uk/william-blinkhorns-monster-chimney-little-john-bolton-lancashire/> [accessed 26 October 2021].
12. Forcing it to construct the high chimney in 1842 and later to close in 1845.
13. Fuller and Weizman, *Investigative Aesthetics.*
14. Nicolas Bourriaud, *Relational Aesthetics* (Dijon: Les Presses du Réel (Collection Documents sur l'art), 2002.
15. Gilbert Simondon, *On the Mode of Existence of Technical Objects*, trans. by C. Malaspina and J. Rogove (Minneapolis, MN: Univocal Publishing, 2017), p. 195.
16. The coalition included UK Lawyers for Israel (UKLFI), the Manchester Jewish Representative Council (JRC), North West Friends of Israel (NWFoI), and the Manchester Zionist Central Council (ZCC).

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arq gratefully acknowledges: Forensic Architecture, all images Michael Pollard, 1, 3–6

Competing interests
The authors declare none.

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