

# seeing beyond the frame(s)

## *a case study of image-to-space analysis for citizen investigation*

Francesco Sebgreondi & Emile Costard – March 23, 2023

• counter-investigation • visual evidence • spatial analysis • state violence • architecture • expertise • open source

On December 1, 2018, on the margins of a gilets jaunes protest in Marseille, 80-year-old Zineb Redouane was struck in the face by a tear gas grenade as she was standing at the window of her fourth-floor apartment. The following day, she died in hospital.

In partnership with the French investigative media organization Disclose, the London-based research agency Forensic Architecture produced a counter-investigation into the circumstances of her death. The resulting report, published in video format in December 2020, provided evidence of the responsibility of the French police for her killing.

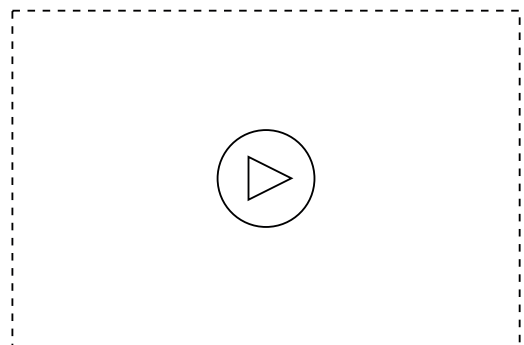
In the proposed publication, the lead researcher on the case for Forensic Architecture and the independent journalist / filmmaker who together authored the report use it as a case-study to discuss the methodology of image-to-space analysis for citizen investigations.

By revisiting the case, the publication brings questions of methods and techniques of visual analysis to the foreground, in an effort to discuss the benefits, as well as the limitations, of using such tools in the particular research framework of a citizen investigation: namely, one in which access to data is limited by underlying structures of power, and where the question of seeing beyond the established frame(s)—of images, of discourses—forms the primary research challenge.

By unpacking the argument presented in the counter-investigation of Zineb Redouane's killing, the publication uses the *video.able* format to deploy an multilayered, visual explanation of the techniques pioneered by Forensic Architecture to produce its investigative reports. In so doing, the aim of the publication is to foster the development, and widespread adoption, of open-source visual techniques for citizen investigations.

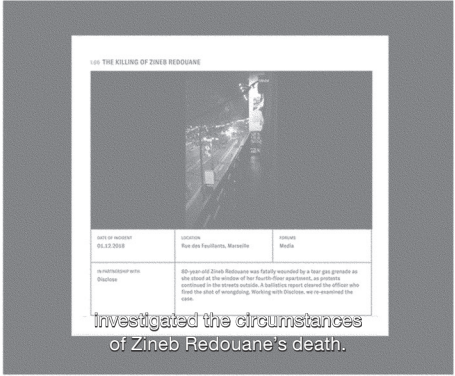
This contribution was published on [www.able-journal.org](http://www.able-journal.org) in a *video.able* format:

[www.able-journal.org/en/seeing-beyond-the-frames](http://www.able-journal.org/en/seeing-beyond-the-frames)





the Forensic Architecture research agency and the Disclose media outlet



investigated the circumstances of Zineb Redouane's death.



the 80-year-old French-Algerian woman was hit by a tear gas grenade



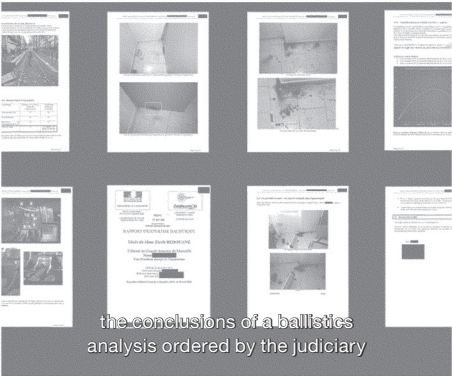
launched as she closed the windows of her apartment,



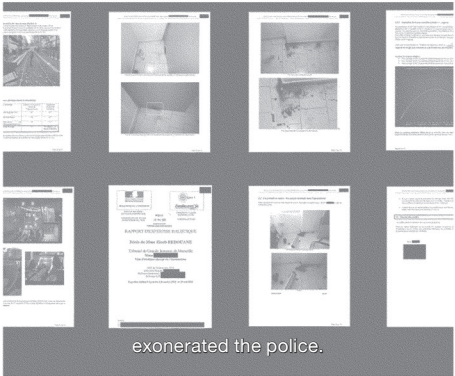
where demonstrators were marching during Act III of the Gilets Jaunes protests.



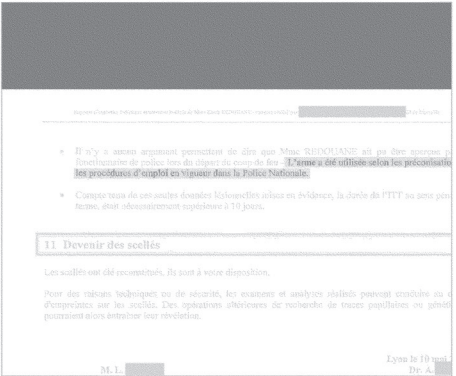
Zineb Redouane died the next day.



the conclusions of a ballistics analysis ordered by the judiciary



exonerated the police.



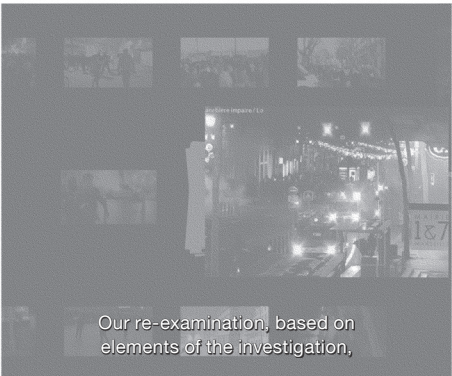
11. Devenir des scellés

Les scellés ont été reconstitués, ils sont à votre disposition.

Pour des raisons techniques ou de sécurité, les examens et analyses réalisés peuvent constituer ou é d'empreintes sur les scellés. Des opérations ultérieures de recherche de traces papillaires ou génétiques pourraient alors entraîner leur révélation.

M. L.

Lyon le 10 mai 2024 Dr. A.



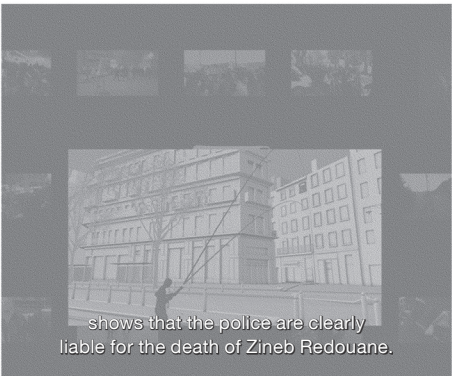
Our re-examination, based on elements of the investigation,



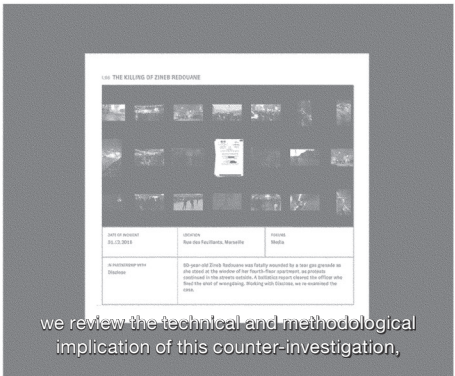
amateur videos,



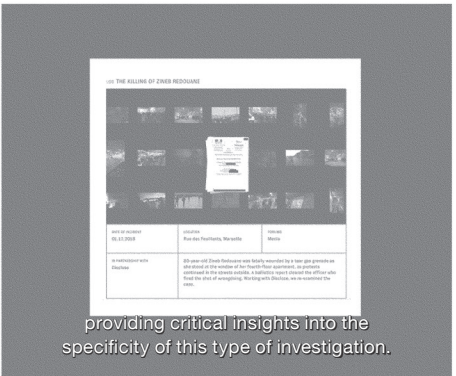
and a 3D reconstruction of events,



shows that the police are clearly liable for the death of Zineb Redouane.

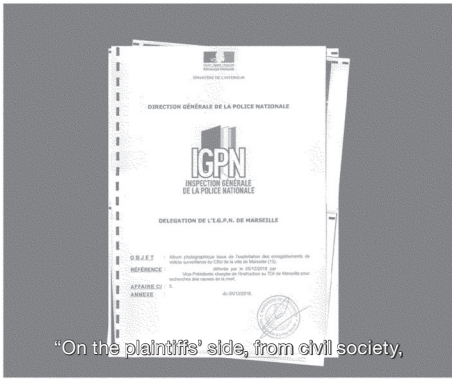


we review the technical and methodological implication of this counter-investigation,

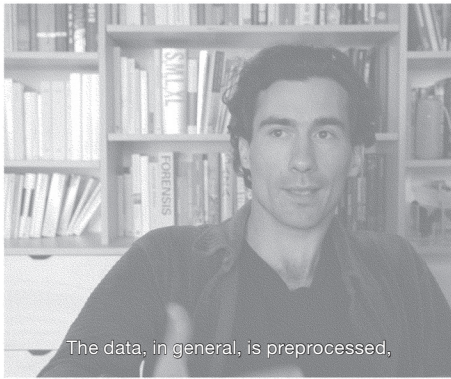


providing critical insights into the specificity of this type of investigation.

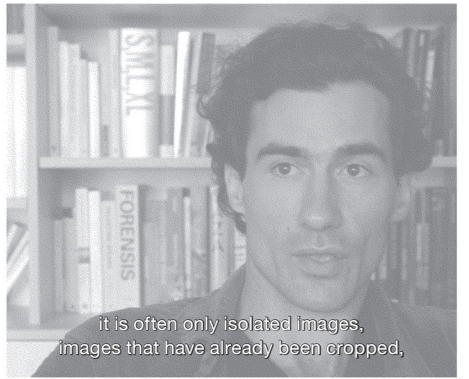




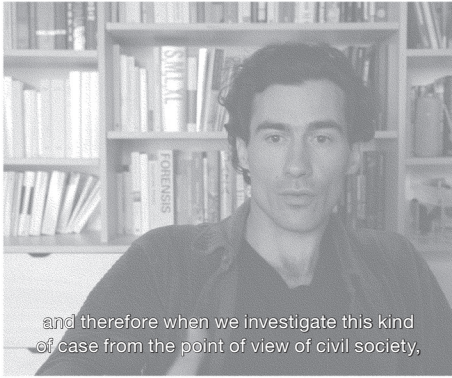
"On the plaintiffs' side, from civil society,



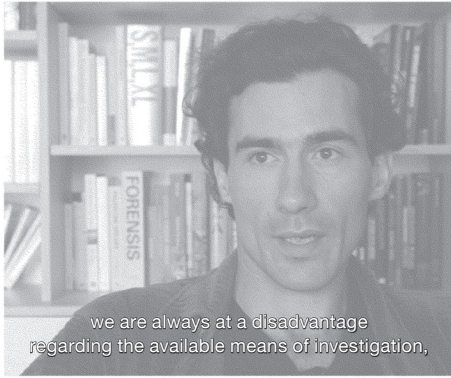
The data, in general, is preprocessed,



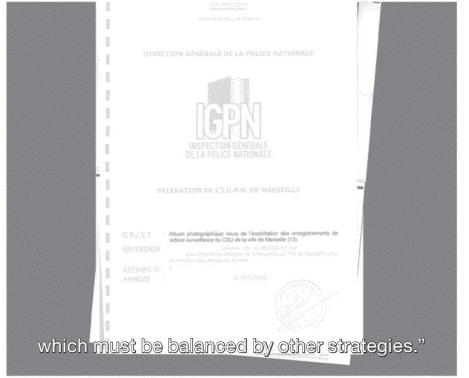
it is often only isolated images, images that have already been cropped,



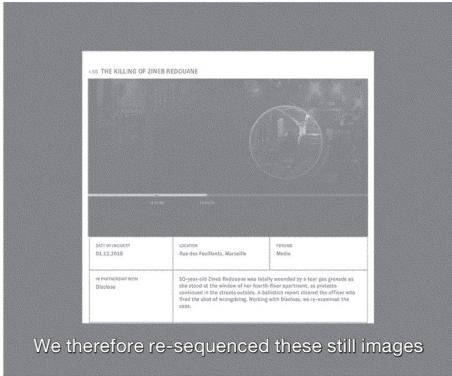
and therefore when we investigate this kind of case from the point of view of civil society,



we are always at a disadvantage regarding the available means of investigation,



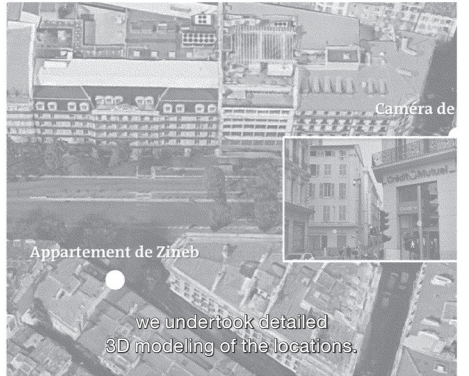
which must be balanced by other strategies."



We therefore re-sequenced these still images



The next step was to reconstruct the shooting in the space



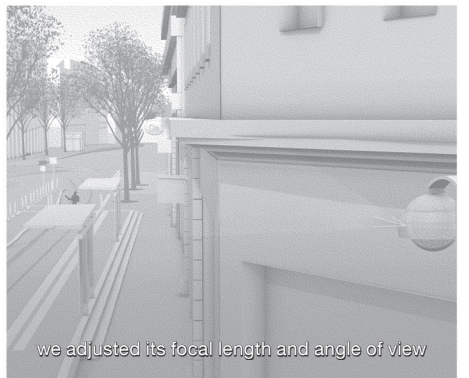
we undertook detailed 3D modeling of the locations,



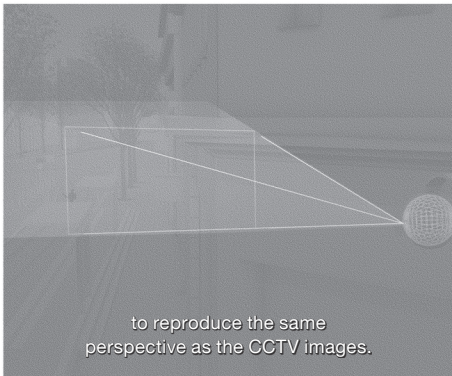
The exact position of the CCTV camera could be determined using Google Street View,



Once the camera was positioned in the 3D model,



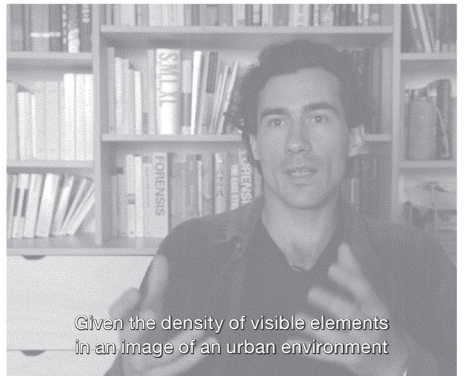
we adjusted its focal length and angle of view



to reproduce the same perspective as the CCTV images.



We call this process "frame matching."



Given the density of visible elements in an image of an urban environment

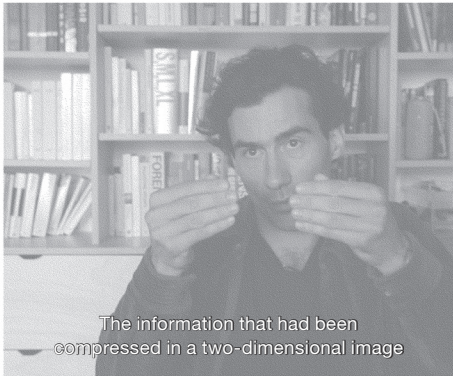




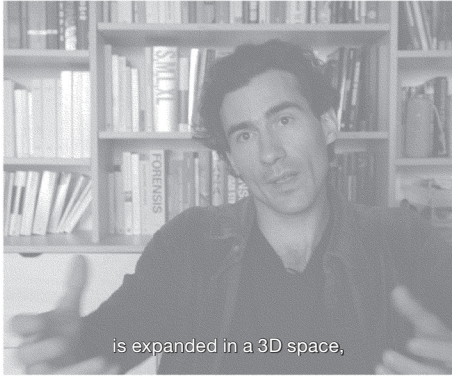
there is only one possible projection of space



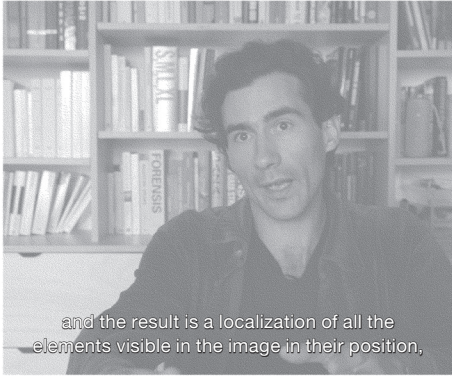
that aligns them all into the image plane.



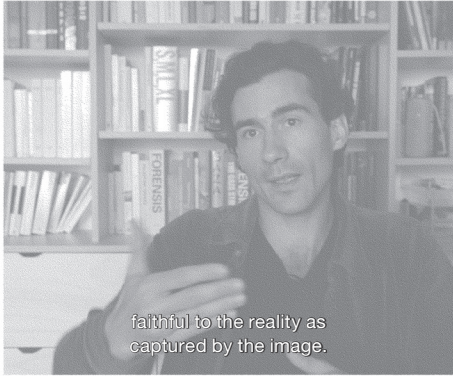
The information that had been compressed in a two-dimensional image



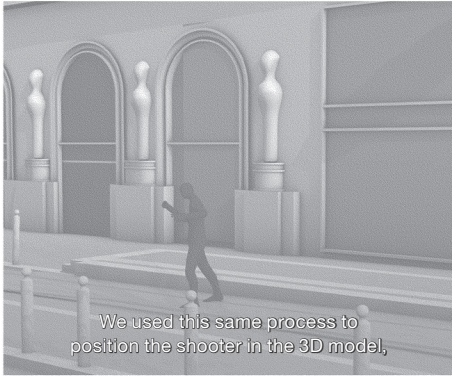
is expanded in a 3D space,



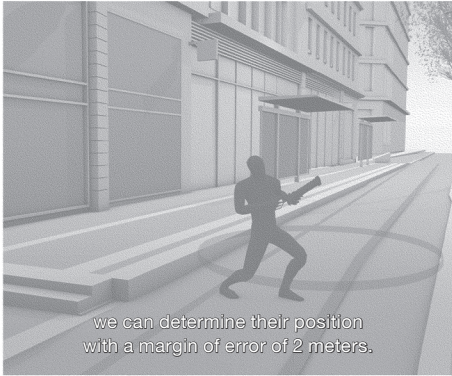
and the result is a localization of all the elements visible in the image in their position,



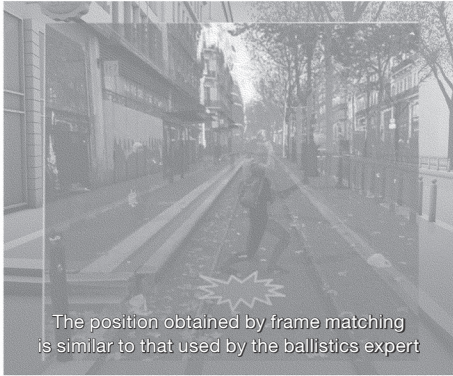
faithful to the reality as captured by the image.



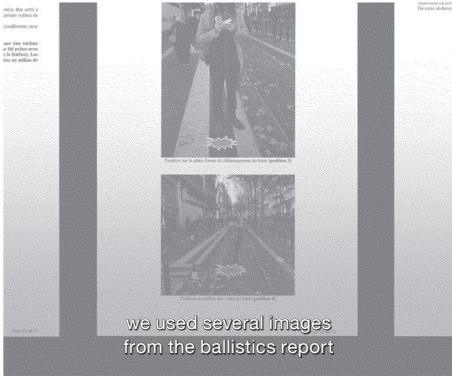
We used this same process to position the shooter in the 3D model,



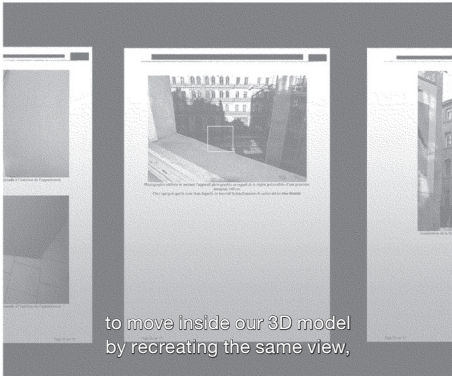
we can determine their position with a margin of error of 2 meters.



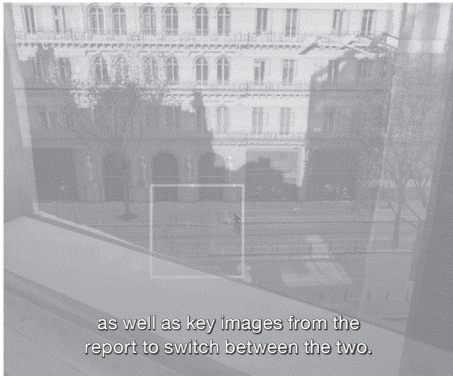
The position obtained by frame matching is similar to that used by the ballistics expert



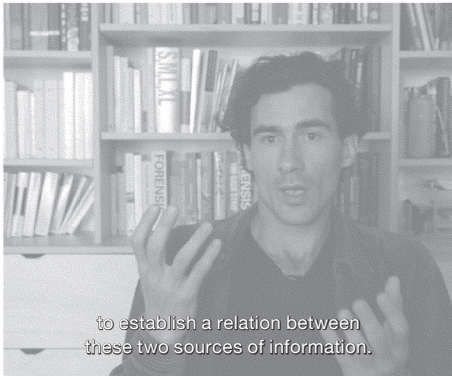
we used several images from the ballistics report



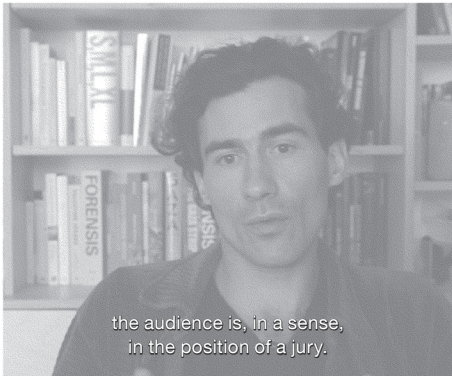
to move inside our 3D model by recreating the same view,



as well as key images from the report to switch between the two.



to establish a relation between these two sources of information.

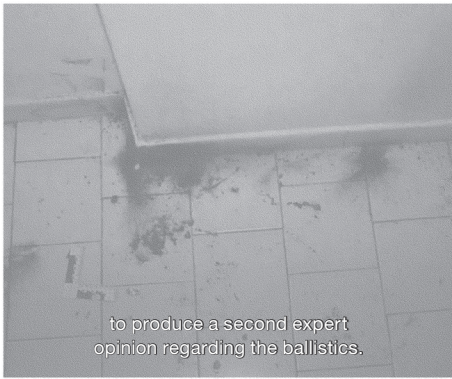


the audience is, in a sense, in the position of a jury.

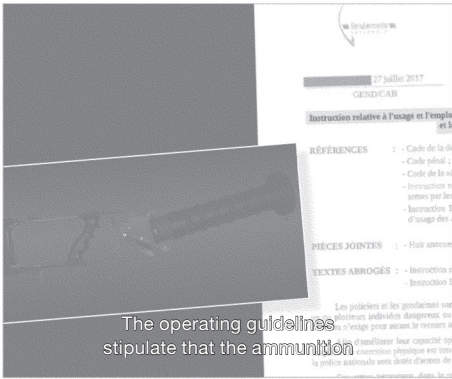


The next step in the investigation was

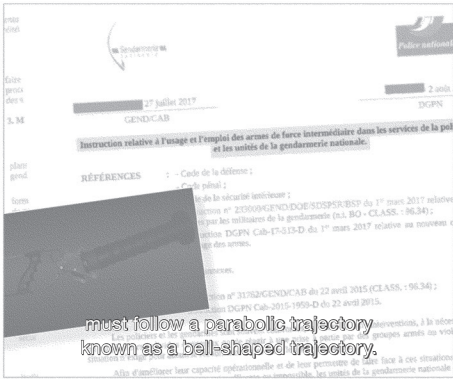




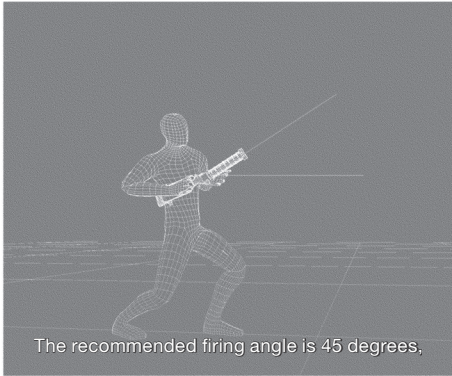
to produce a second expert opinion regarding the ballistics.



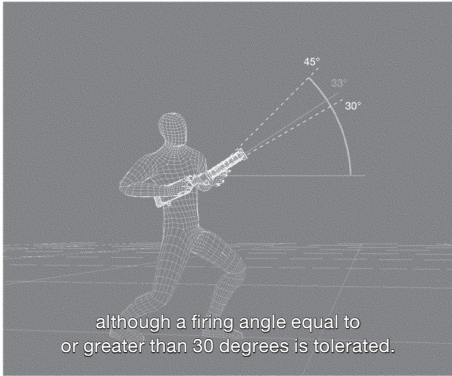
The operating guidelines stipulate that the ammunition



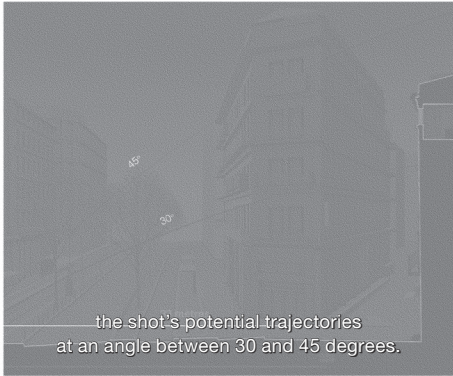
must follow a parabolic trajectory known as a bell-shaped trajectory.



The recommended firing angle is 45 degrees,



although a firing angle equal to or greater than 30 degrees is tolerated.



the shot's potential trajectories at an angle between 30 and 45 degrees.



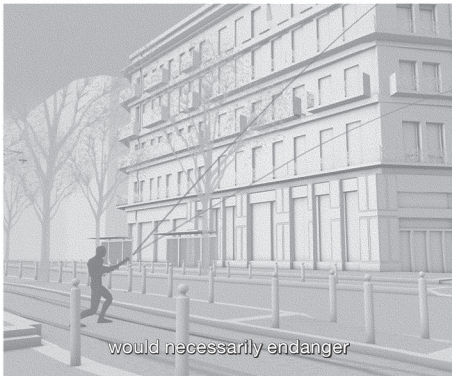
we see that whatever the firing angle,



the grenade's trajectory is cut by the front of the building opposite.



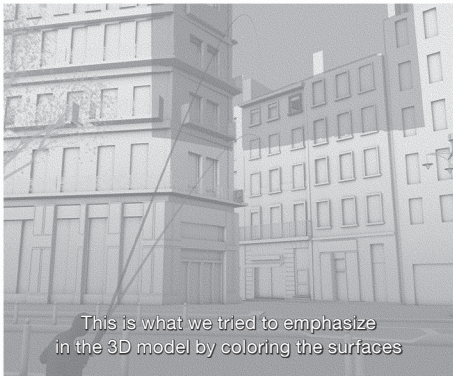
A shot from this position with a Cougar launcher



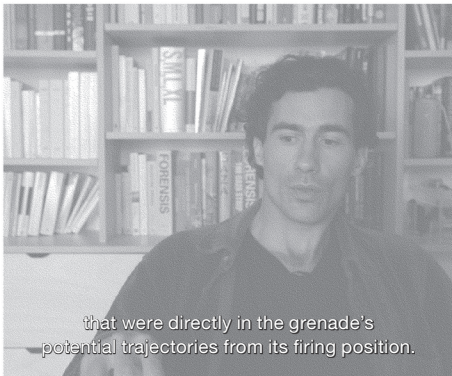
would necessarily endanger



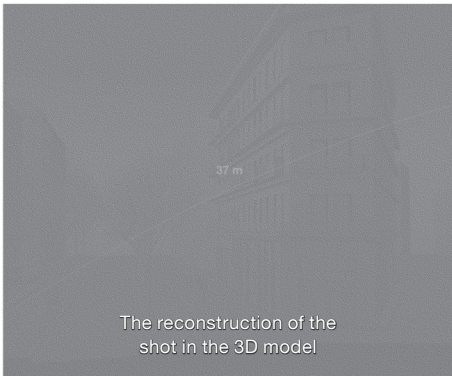
all the inhabitants of the upper floors of the buildings located on the Rue des Feuillants,



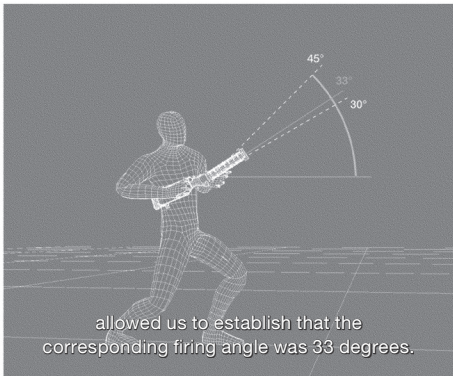
This is what we tried to emphasize in the 3D model by coloring the surfaces



that were directly in the grenade's potential trajectories from its firing position.

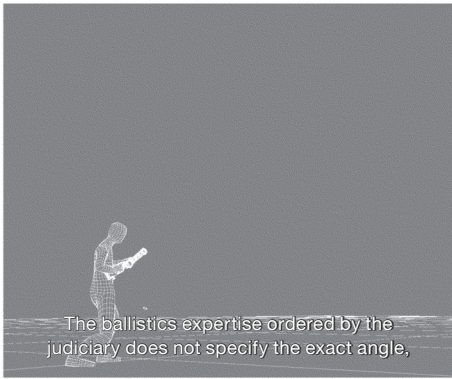


The reconstruction of the shot in the 3D model

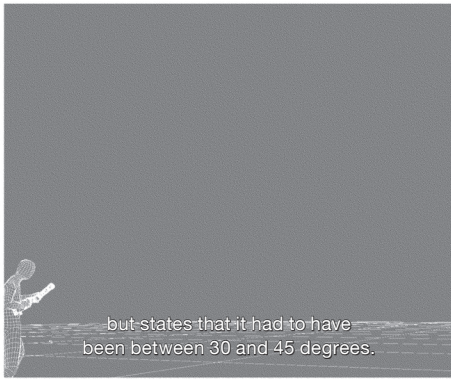


allowed us to establish that the corresponding firing angle was 33 degrees.

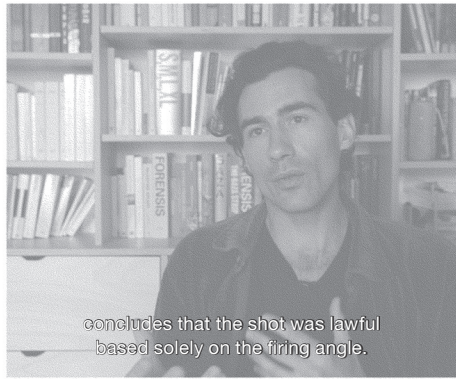




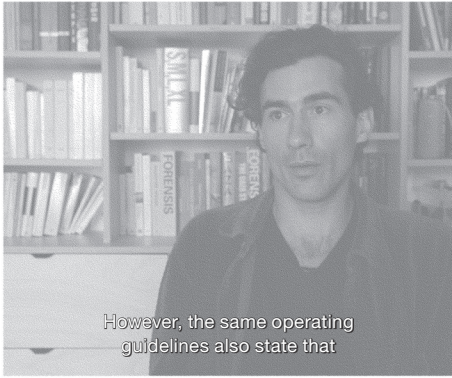
The ballistics expertise ordered by the judiciary does not specify the exact angle,



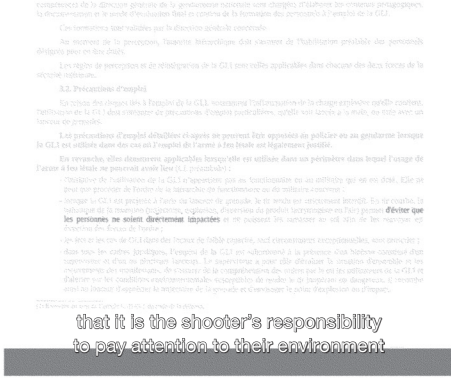
but states that it had to have been between 30 and 45 degrees.



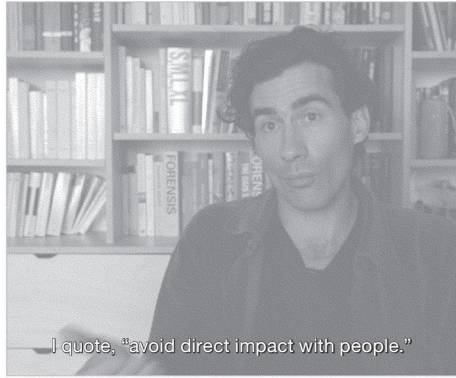
concludes that the shot was lawful based solely on the firing angle.



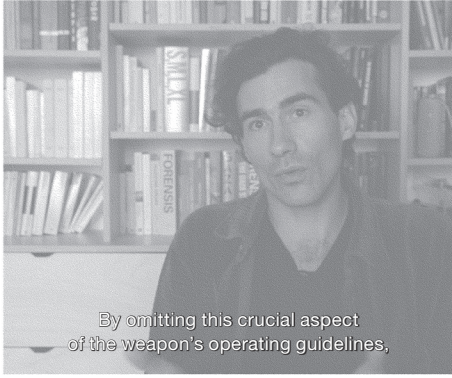
However, the same operating guidelines also state that



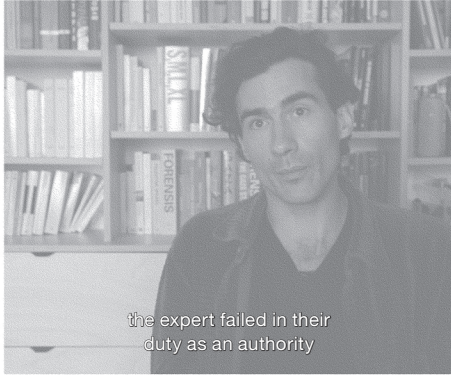
that it is the shooter's responsibility to pay attention to their environment



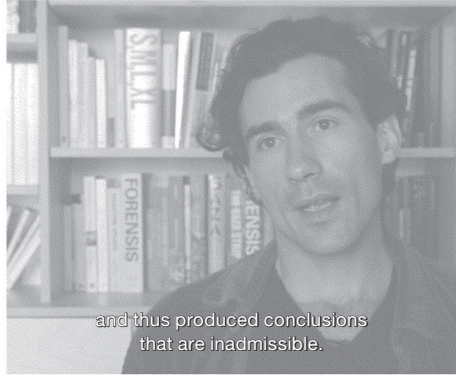
I quote, "avoid direct impact with people."



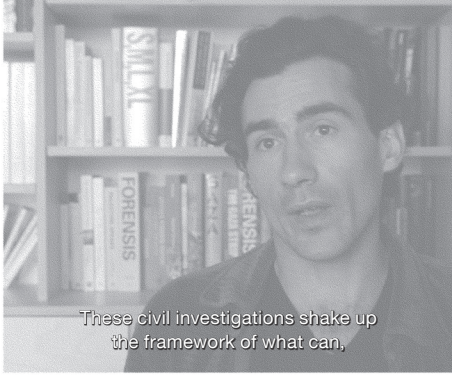
By omitting this crucial aspect of the weapon's operating guidelines,



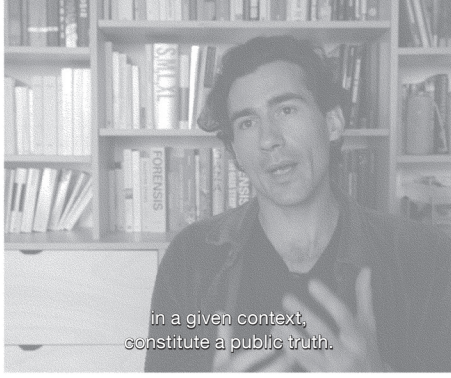
the expert failed in their duty as an authority



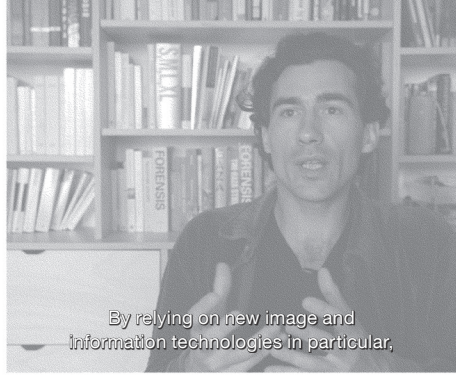
and thus produced conclusions that are inadmissible.



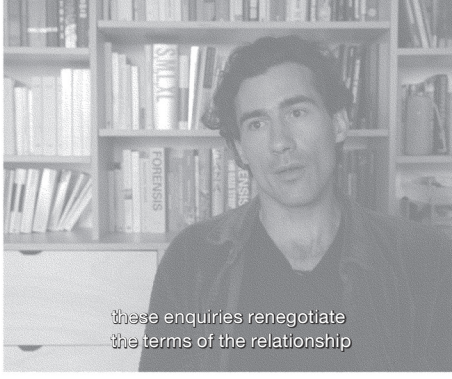
These civil investigations shake up the framework of what can,



in a given context, constitute a public truth.



By relying on new image and information technologies in particular,



these enquiries renegotiate the terms of the relationship

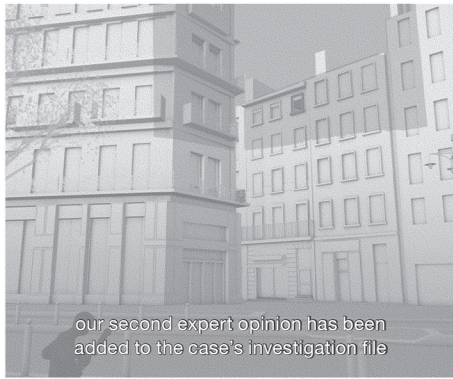


between power and public discourse.



The judiciary is still to rule on the conclusions of the ballistics report

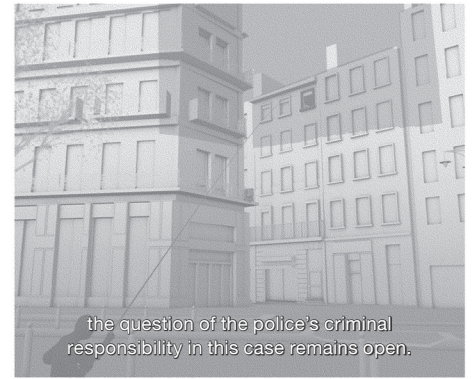




our second expert opinion has been added to the case's investigation file



by the legal representative of the plaintiffs constituted as a civil party.



the question of the police's criminal responsibility in this case remains open.

## credits

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**“The Killing of Zineb Redouane,” Forensic Architecture investigation team:**

**project coordinator:** Francesco Sebreghondi

**researcher:** Martyna Marciniak

**video editing:** Emile Costard

**Disclose team:** Mathias Destal, Magali Serre

**acknowledgments:** “Collectif Désarmons-Les” ; Milfet Redouane.

## about the authors

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**Emile Costard**, a journalist and director has specialized for several years in the production of investigative videos for online media. A regular contributor to the newspaper Le Monde since 2013, he has recently worked for the BBC, Médiapart, Disclose, and the Forensic Architecture research laboratory.

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**Francesco Sebreghondi** (PhD) is an architect and researcher. His work explores the intersection of violence, media, and the urban condition. From 2011 to 2020, he was a researcher and project coordinator at the Forensic Architecture research lab. In 2021, he founded and is the director of the independent expertise agency INDEX. He is currently a research associate at EnsadLab.

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# rights and references

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## illustration rights and references

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Portrait of Zineb Redouane, date unknown. Courtesy of Milfet Redouane.

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## bibliography and references

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APA        EN        Sebregondi, F., & Costard, E. (2023). Seeing Beyond the Frame(s): a Case Study of Image-to-Space Analysis for Citizen Investigation. *able journal*. <https://able-journal.org/en/seeing-beyond-the-frames>