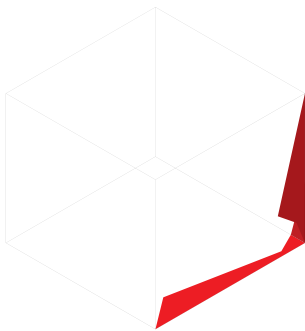


# Studies in Material Thinking



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VOLUME 13

**VISUAL / TEXTUAL: DOCUMENTING THE REALITIES  
OF RESEARCH THROUGH DESIGN PRACTICE.**

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PAPER 01

**Reflections on Research through Design:  
The Evolution of Silence**

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**Rachele Riley**

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**ABSTRACT**

*'The Evolution of Silence' is a Web-based archive and interpretive map of the Yucca Flat valley of the Nevada Test Site (the site of forty-one years of post-WWII nuclear testing in the United States). In this essay I share insight into my process of research through design and the role of the artifact in development. The project investigates the ways design creates experiences that allow for critical engagement with difficult subjects and emphasizes the exploration of the language of maps and the principles of interaction. My focus is on experimentation with visual/textual language; interpretation, representation and organization of spatial information and of archival material; and approaches to creating and sharing knowledge.*

**KEYWORDS**

*Design, research, data, visualization, maps, interaction, archives, aesthetics, experimental, trace*

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**STUDIES IN MATERIAL THINKING**

[www.materialthinking.org](http://www.materialthinking.org)

ISSN: 1177-6234

Auckland University of Technology

First published in April 2007,

Auckland, New Zealand.

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**STUDIES IN MATERIAL THINKING**

is a peer-reviewed research journal supported by an International Editorial Advisory Group.

The journal is listed in the Australian ERA 2012

Journal List (Excellence in Research for Australia)

and in the Norwegian register of approved scientific journals, series and publishers.

## Reflections on Research through Design: The Evolution of Silence

'...all archives are realized in destruction, preserved by the traces of destruction.'

(Lippit, 2005, p.9)

At the heart of my research and design practice is the desire to test out and experiment with the language of abstraction and its potential as it relates to design interpretations of conflict. Does the transformative aesthetic experience of conflict allow for reconciliation, critical engagement, understanding, and emotional connection to be formed to people and places that are elsewhere and far-removed? Does this kind of artifact invite engagement from viewers at a deeper level? Does it inspire exploration and sustain curiosity?

62.

### Apple-2

5-May-55

Atmospheric Test  
Detonated from a Tower  
Operation Teapot

PURPOSE:  
Weapons Related  
LOCATION: Area 1

2000

4000 ft



Screen shot from the Web, 'The Evolution of Silence,' 2008-2015. © Rachele Riley

92.

### Coulomb-A

1-Jul-57

Atmospheric Test  
Detonated from a Surface

Operation Plumbbob

PURPOSE:

Safety Experiment

LOCATION: Area 3

Radioactivity

not  
detected

Given the complexity of the world, there is value in designing experiences that allow people to individually process data and to independently create meaning. What we design is never neutral. Take the experience of war as an example. Many of us experience war through its information. How does this relate to our understanding of a real experience of war? Conveying feelings of confusion and of disorientation, creating a jarring experience, can perhaps lead to new knowledge and provoke questioning. If we design experiences that disrupt the repetition and the automatic processing of information, to instead invite contribution and elicit reaction, will experience resonate more deeply?

#### NOTE 01

In *THE SPIRIT OF TERRORISM* (2002, p. 28), Jean Baudrillard describes violence in itself as 'banal and inoffensive.' It is 'symbolic violence' that generates a singularity and it is this image that stays with us. Real is added as a kind of bonus: 'not only is it terrifying, but it is real.' Baudrillard has criticized the medium of television for placing viewers before a simulated world, where the difference between reality and fiction has blurred. Television news is all surface: a collage of fragmented images of images, divorced from an original. This representation becomes real to the viewer.

Consider the nightly news as a platform for experiencing the information of war. In the mid 2000's in the United States the names and the numbers of American soldiers wounded in Iraq were recounted individually every evening. It is hard to grasp the human, cultural, environmental impact in some instances of information design when all gesture, imperfection, confusion, and emotion are removed from visual language. It is hard in these cases to see how the numbers accumulate to form a whole. The nightly announcements of the numbers and names of the wounded or dead were made as if it had recently happened or, rather, as soon as the information was released. This created a secondary experience of war through the staggered, fragmented, and controlled sharing of its information. (BAUDRILLARD, 2002, SEE NOTE 01) How does one reflect on the pieces of conflict, on the traces? In a project that I developed at the time ('Visualizing the Art of War') I marked the reported war activity through drawing, cutting, lettering and erasing. I then created a visual memory of these experiences through a series of artifacts that together serve as palimpsest or archive, bearing the traces of destruction while describing destruction. It is a record of the dynamics of conflict through its changing information over time. Through this work, I embraced and examined the fragmentary nature of both memory and ruin, and considered the words of Susan Sontag from *REGARDING THE PAIN OF OTHERS*, 'To make peace (with acts of violence) is to forget. To reconcile, it is necessary that memory be faulty and limited.' (SONTAG, 2003, p.115).



Still from single-channel video, 'Visualizing the Art of War,' 2005. © Rachele Riley

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n-57  
spheric Test  
ated from a Balloon  
tion Plumbbob  
OSE:  
ons Related  
TION: Area 9

Introduction to the designed artifact. 'The Evolution of Silence' presents the results of my research on the impact of forty-one years of nuclear testing in the United States in the form of an exploratory design work. It is in itself a fragment of a larger continued exploration of the topic. Fragmentation in the work also refers to the incompleteness of memory and the partial traces of time and activity. One discovers these as one drills into the multiple interactive layers of the reconstructed landscape.

4000 ft



Screen shot from the Web, 'The Evolution of Silence,' 2008–2015. © Rachele Riley

1020.  
**Texarkana**  
10-Feb-89  
Underground Test  
Detonated from a Shaft  
Operation Cornerstone  
PURPOSE:  
Weapons Related  
LOCATION: Area 7  
LAT: 37.077 LON:  
-116.001

I take an experimental approach towards designing information, one that involves visualizing and blurring what is fact and what is interpreted. The website makes use of the innovative strengths of jQuery and HTML5 in coding for dynamic events and efficiency. The site pulls all content as data (visual, textual, audio, video) from values in a single Excel sheet. The website's design is different than other web-based maps in its dominant aesthetic of imaging and layers, and in its ambiguity (upon first encounter). 'Is this the Moon?' viewers have asked. Web-based maps comprising satellite images are familiar, but in 'The Evolution of Silence' the fragments that form the composite of the valley are still visible as fragments. In contrast, Google Earth/Maps stitches the same satellite view source files into a seamless image of the Earth's surface. No disruption.

In its interaction and visual design, the website challenges the expectations of the viewer by shifting the boundaries of control: one moves through the landscape as I have reconstructed it but is able to break it apart back into its fragments. The interface questions notions of stability, factuality and the conventions of orientation in maps and in information architecture. As a result the design contributes to creating the feeling one is exploring the unknown, only to find it is heavily named, charted, and identified. One enters into the information of war and experiences a connection of data to location. The idea of knowing a place, here, is framed by a multi-faceted inquiry and process that is fluid and always changing.

## Ballones

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Ground Test  
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tion Cresset  
OSE:  
ons Related  
TION: Area 2  
7.136 LON:  
087

The project houses data on the eight hundred and twenty-eight (828) nuclear detonations that occurred in the Yucca Flat valley of the Nevada Test Site from 1951 (the year of the first nuclear test at the Nevada Test Site) to 1992 (when a U.S. moratorium on nuclear testing was established). It presents this data primarily through the form of a web-based interactive map, allowing one to bypass government boundaries and control of the area and engage each of the individual nuclear detonations. 'The Evolution of Silence' identifies and locates these detonation sites, also providing further historical notes and artistic interpretation. Visual and textual details connected to a detonation are revealed as one hovers over its representative square image. Tiled with hundreds of other representative images, each instant of a detonation combines and builds an overall view of the pockmarked valley landscape.

4000 ft

17.

### Baker

28-Oct-51

Atmospheric Test  
Detonated from a Airdrop

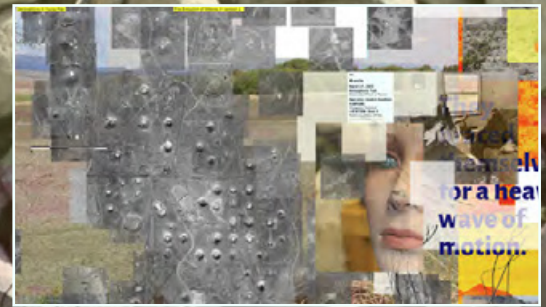
Operation Buster

PURPOSE:  
Weapons Effects  
LOCATION: Area 7

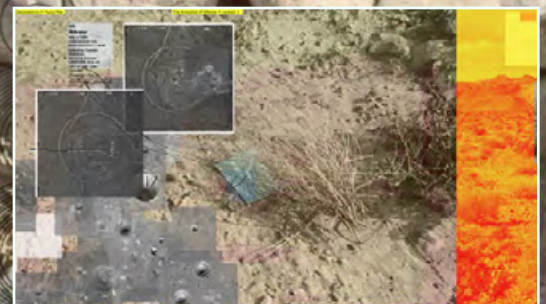
'The Evolution of Silence' fills a research gap by providing a visual representation of the location of every nuclear detonation in Yucca Flat. Maps exist that identify the location of every underground test but they do not include photographic or satellite reference imagery for each location. This exclusion makes it difficult to understand the physical relationship of one detonation to another in space. The Nevada Test Site is a remote and highly restricted area. Yucca Flat Valley, aptly named 'the most bombed place on earth,' is marked by hundreds of sink-hole craters, the result of hundreds of underground explosions. One can visit the Nevada Test Site in person, but recording and photography is not permitted. A challenge to developing the project and fulfilling its research purpose was the question of how to bypass government boundaries that not only restrict one's exploration of the physical landscape, but also its representation.

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**Methodology and Translation.** Research began by reading a number of books on nuclear testing that I located in libraries, and has progressed into specialized archival research into collections of maps, newspapers, photographs, films, and documents. I have traveled to the collections of several libraries and archives located in Las Vegas, NV and Washington, DC (The National Archives and the Library of Congress in Washington, D.C., the Cahlan Research Library at the Nevada State Museum, the University of Nevada Las Vegas Special Collections, Mercury Core Library at the United States Geological Survey (Nevada Office) and the Nuclear Testing Archive at the National Atomic Testing Museum). I have been tracking records, documents, newspaper articles, and photographs related to Yucca Flat valley's environmental transformation, the era of nuclear testing, and the L.A. Darling Co. mannequins used in the Civil Defense tests of the early 1950's. My primary goal is to search for material that provides contrast to the official government data.



Screen shot from the Web depicting mannequins, 'The Evolution of Silence,' 2008-2015. © Rachele Riley



Screen shot from the Web, 'The Evolution of Silence,' 2008-2015. © Rachele Riley

I was inspired to investigate nuclear testing and Yucca Flat after reading Rebecca Solnit's, *SAVAGE DREAMS: A JOURNEY INTO THE LANDSCAPE WARS OF THE AMERICAN WEST*, in which the politics and history of the Nevada Test Site are discussed. I was intrigued by the marking and disruption of Yucca Flat valley (it is a striking landscape of hundreds of craters) and the potential for this landscape to symbolize the activity and impact of war. In May 2008, supported by a Faculty Research Grant from the University of North Carolina Charlotte, I made my first field visit and tour of the Nevada Test Site (now the Nevada National Security Site), located approximately 65 miles (104 km) north of the city of Las Vegas. Day-long bus tours are conducted monthly and are led by former Department of Energy employees. We were driven among the ruins and debris of nuclear testing: inside the low and wide Bilby Crater, and around parts of bridges, concrete structures, and a solitary brick house that survived the 1955 Apple Test. The tour culminates with a stop at Sedan Crater (at the northeastern part of Yucca Flat valley). At this point we were allowed to step off the bus and stand at the crater's edge. Formed July 6, 1962, it is the largest crater of the nuclear testing program with a depth of 320 feet (100 meters) and a diameter of 1,280 feet (390 meters).



Sedan Crater

944.

### Caprock

31-May-84

Underground Test  
Detonated from a Shaft  
Operation Fusileer

**PURPOSE:**

Weapons Related

**LOCATION:** Area 4

**LAT:** 37.103 **LON:**

-116.049

Since no photography, video, or sound recording is allowed within the Nevada Test Site, the most pressing initial challenge for my project was in finding an approach to documenting the environment and visualizing the striking details of this altered landscape. I photographed historical and contemporary maps of the area, and traveled to the National Desert Wildlife Refuge to photograph and document the Mojave/Great Basin desert ecology and to record sounds and wind movements.

After my first field visit, I consolidated data from the Department of Energy and archival sources to create one list of every detonation that occurred in Yucca Flat valley. I began sketching and concept mapping, and animating scenes of the valley. I discovered that images of Yucca Flat exist, but no systematic photographic record of the exact site of each detonation in the valley. My next step was to generate this data myself. In Fall/Winter 2009, I mapped the location of each underground nuclear explosion (latitude and longitude coordinates are provided for these) in Google Earth. While in satellite view, I took a screen shot of each location from an overhead distance of 700 km. This process created 812 separate images; each one represented the site of an individual nuclear detonation that occurred in Yucca Flat. Despite the exhaustive data collected and generated, I had to reconcile myself with the impossibility of acquiring everything or visualizing all aspects, to collect every perspective on the place, every relationship and contrary point of view, every interpretation made and archival image found, or every anecdote. There is always more to uncover and to include: 'The more knowledge [grows], the greater the unknown [grows], we might conclude; or rather, the more information flashes by the more aware we are of its incomplete fragmentary nature.' (VIRILIO, 1991, p. 45)



Detail from the dataset from which jQuery dynamically builds the web-based 'The Evolution of Silence.' 2008-2015.  
© Rachele Riley

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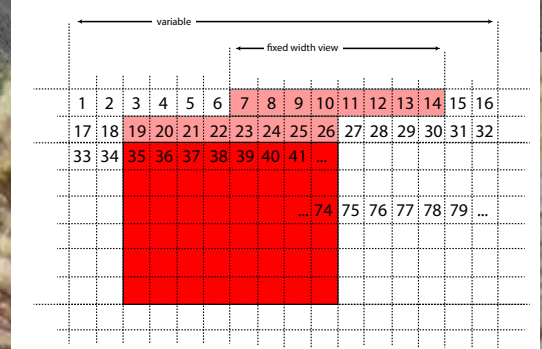
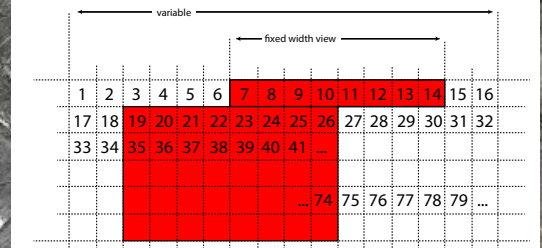
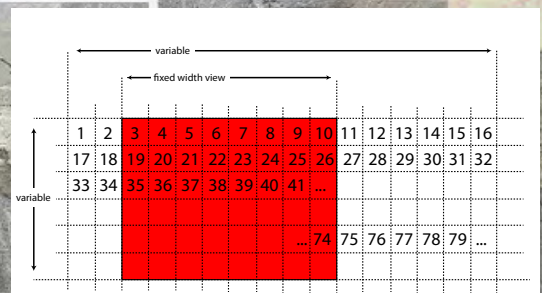
images/fullsize/large\_ 224.jpg  
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278	Peba	September 20, 1962	U3bb	3	Weapons Relat	Low				cellCaption5	images/fullsize/large_ 278.jpg
279	Allegheny	September 29, 1962	U9x	9	Weapons Relat	Low				cellCaption5	images/fullsize/large_ 279.jpg
281	Mississippi	October 5, 1962	U9ad	9	Weapons Relat	115 kilotons				cellCaption5	images/fullsize/large_ 281.jpg
283	Roanoke	October 12, 1962	U9q	9	Weapons Relat	Low				cellCaption5	images/fullsize/large_ 283.jpg
284	Wolverine	October 12, 1962	U3av	3	Weapons Relat	Low				cellCaption5	images/fullsize/large_ 284.jpg
286	Tioga	October 18, 1962	U9f	9	Weapons Relat	Low				cellCaption5	images/fullsize/large_ 286.jpg
287	Bandicoot	October 19, 1962	U3bj	3	Weapons Relat	12.5 kilotons				cellCaption5	images/fullsize/large_ 287.jpg
290	Santee	October 27, 1962	U10f	10	Weapons Relat	Low				cellCaption5	images/fullsize/large_ 290.jpg
295	St. Lawrence	November 9, 1962	U2b	2	Weapons Relat	Low	913.067	610.215		cellCaption5	images/fullsize/large_ 295.jpg
296	Gundl	November 15, 1962	U3bm	3	Weapons Relat	Low	1648.499	3876.309		cellCaption5	images/fullsize/large_ 296.jpg
297	Anacostia	November 27, 1962	U9i	9	Plowshare	5.2 kilotons	1985.816	2066.796		cellCaption5	images/fullsize/large_ 297.jpg
298	Taunton	December 4, 1962	U9aa	9	Weapons Relat	Low	1541.575	1935.422		cellCaption5	images/fullsize/large_ 298.jpg
299	Tendrac	December 7, 1962	U3ba	3	Joint US-UK	Low	1547.211	3614.699		cellCaption5	images/fullsize/large_ 299.jpg
301	Numbat	December 12, 1962	U3bu	3	Weapons Relat	Low	1838.906	3771.335		cellCaption5	images/fullsize/large_ 301.jpg
302	Manatee	December 14, 1962	U9af	9	Weapons Relat	Low	1753.413	2035.233		cellCaption5	images/fullsize/large_ 302.jpg
303	Casselman	February 8, 1963	U10g	10	Weapons Relat	Low	1356.408	1001.963		cellCaption5	images/fullsize/large_ 303.jpg
304	Acushi	February 8, 1963	U3bg	3	Weapons Relat	Low	1721.291	3771.679		cellCaption5	images/fullsize/large_ 304.jpg
305	Ferret	February 8, 1963	U3bf	3	Weapons Relat	Low	1547.003	3447.151		cellCaption5	images/fullsize/large_ 305.jpg
306	Hatchie	February 8, 1963	U9e	9	Weapons Relat	Low	1773.429	1985.797		cellCaption5	images/fullsize/large_ 306.jpg
307	Chipmunk	February 15, 1963	U3ay	3	Safety Experir	Low	1929.869	4051.34		cellCaption5	images/fullsize/large_ 307.jpg
308	Kaweah	February 21, 1963	U9ab	9	Plowshare	3 kilotons	1630.968	2147.204		cellCaption5	images/fullsize/large_ 308.jpg
309	Carmel	February 21, 1963	U2h	2	Weapons Relat	Low	760.285	851.574		cellCaption5	images/fullsize/large_ 309.jpg
310	Jerboa	March 1, 1963	U3at	3	Weapons Relat	Low	1608.198	3827.654		cellCaption5	images/fullsize/large_ 310.jpg
311	Toyah	March 15, 1963	U9ac	9	Weapons Relat	Low	1649.785	1987.808		cellCaption5	images/fullsize/large_ 311.jpg
312	Gerbil	March 29, 1963	U3bp	3	Weapons Relat	Low	1776.186	3876.976		cellCaption5	images/fullsize/large_ 312.jpg
313	Ferret Prime	April 5, 1963	U3by	3	Weapons Relat	Low	2091.378	4372.645		cellCaption5	images/fullsize/large_ 313.jpg
314	Coypu	April 10, 1963	U3af	3	Safety Experir	Low	1973.803	4056.634		cellCaption5	images/fullsize/large_ 314.jpg
315	Cumberland	April 11, 1963	U2e	2	Weapons Relat	Low	949.64	792.406		cellCaption5	images/fullsize/large_ 315.jpg
316	Kootanal	April 24, 1963	U9w	9	Weapons Relat	Low	1835.218	2120.639		cellCaption5	images/fullsize/large_ 316.jpg
317	Palsano	April 24, 1963	U9w1	9	Weapons Relat	Low	1842.596	2141.446		cellCaption5	images/fullsize/large_ 317.jpg



Developing Material for the Web. With my new collection of photographic data, I began to consider the project as a way to conceptually reclaim the valley: from government restriction and from its composite representation via satellite image capture. I developed a feeling of closeness or connection for this inhospitable and damaged place, and hoped to inspire this in others. So how could I make use of the objective and subjective qualities of maps and the accessibility of a web-based project to communicate the complexity of this place? I worked with a developer to overcome some of the technical constraints of visualizing so much data dynamically on the Web and to push its boundaries (as it relates to aesthetics) to incorporating multiple layers, to designing motion and interaction, to the experience of reading and the use of typography, and to the expressive use of images and a respect for their material/archival qualities.

In 2010, I designed and developed my first web-based prototype in JQuery, HTML, CSS. I then moved forward from these prototype sites: which I created on my own to be able to see one layer of the data in relation to another, to see the photographs I collected from Google Earth combined with the Department of Energy data of each detonation. After I made these tests, I could more deeply explore future possibilities for the design and began to make structural and conceptual diagrams, visual storyboards, and procedural lists. I used these to communicate my design goals to Web Developer, Danniell Gaidula. In Spring 2011, I received a Faculty Research Enrichment Grant from The University of the Arts in Philadelphia to work with Danniell to rewrite the code in order to dynamically build the visual layout, the layers and all its visual/textual elements, from the data values of an Excel sheet. He worked to transform my initial interactive experiments to create a rough version of the site that I could explore by changing elements and parts of code to shift arrangements, combinations, and create meaning. I worked independently this way on the site for about twelve months, continuing my archival research, making images and video, editing sound, and adding all this content in the code.



Sketches/diagrams of interaction, 'The Evolution of Silence,' 2008–2015. © Rachele Riley



Early iteration in chronological view, 'The Evolution of Silence.' 2008–2015. © Rachele Riley

1047.

## Lubbock

18-Oct-91

Underground Test  
Detonated from a Shaft

Operation Julin

PURPOSE:

Weapons Related

LOCATION: Area 3

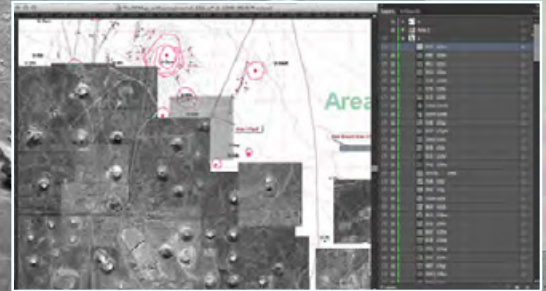
LAT: 37.063 LON:

-116.046

I have come to visually recognize the landmarks of the Nevada Test Site, initially via satellite view in Google Earth and later by acquiring high-resolution satellite images from the DigitalGlobe Foundation. In Spring 2011, I filed a Freedom of Information Act Request with the U.S. Government and finally received access to 300 aerial photographs taken by the United States Geological Survey and used to map the surface effects of nuclear testing. These previously unpublished images depict the before and after states of detonation sites and are included in my web-based project.

I spent several weeks in Fall 2012, while on a Semester Course Release from The University of the Arts, tiling the 812 individual images appropriated from Google Earth satellite view. In the background I used a map by Dennis Grasso (GRASSO, 2000) as a guide to matching the identity of each detonation with the images that I had created. I created a composite view of the valley in Illustrator and determined the 'x, y' coordinates for each image in this tiling. With this new data, added to the Excel sheet, I was able to recreate the spatial relationship of each detonation on the Web. The Web browser dynamically interpreted and generated a geographic view of the valley from those 'x, y' positions.

There have been five rounds of iterations to the web-based project. Each improvement requires technical innovation and creativity: rewriting and reconfiguring the code to balance the need for a necessary degree of optimization and accessibility, while preserving visual complexity and an overwhelming quality. The project's current published version, 'The Evolution of Silence: version 1,' is fully functioning, requires a modern browser to experience (fastest is Google Chrome), and is online at: [www.evolution-of-silence.net](http://www.evolution-of-silence.net).



Mapping every detonation in Yucca Flat for 'The Evolution of Silence.' 2008-2015. © Rachele Riley



Imaging sketch for location/geographic view, 'The Evolution of Silence.' 2008-2015. © Rachele Riley

utaneous,  
vrate

4000 ft

```
339     outputBuffer += '<p>' + 'Yield: ' + myGrid.data[cellIndex][yieldKey] + '</>'
340 }
341
342 if(Boolean(myGrid.data[cellIndex][whyKey])){
343     outputBuffer += '<p>' + myGrid.data[cellIndex][whyKey] + '</p>';
344 }
345
346
347
348 if(Boolean(myGrid.data[cellIndex][linkKey])){
349     outputBuffer += '<p><a href="' + myGrid
```

**NOTE 02**

'The Evolution of Silence' was installed at the SIGGRAPH 2014 Conference and Art Gallery exhibition, 'Acting in Translation,' in Vancouver, Canada, August 9–14, 2014. Comments from viewers were not collected systematically, but since I was often there presenting the work to people, I received feedback in person. People seemed to feel that the aesthetic was strong and engaging. They found that it fit the exhibition theme and that the landscape evoked a breathing being (because of the sound). They were surprised by what they uncovered in the content, by the number of detonations, and they engaged the site to learn more.

**Working with maps and imagery. The data is narrative. I aimed to design a dynamic interactive structure with an experimental approach. The sources of data are diverse and I continue to add content. The design of the website is built on the importance of technical flexibility; and on the idea that memory is malleable and that knowledge is created through experience. It serves two immediate practical functions of being coded the way it is: 1. A dynamic structure allows for 812 images to load at once in order to build the composite image of the valley landscape, and 2. It allows for an individual experience of each detonation. Each image of a detonation has unique content revealed within and, as some viewers uncover through their exploration, all images, which make up the larger image of the valley can be rearranged. This participatory element is designed to aid in understanding the scale of impact. Viewers can separate one tiled square image from another, to read more closely or to analyze its multiple layers better. I have been able to observe people interacting with the work when it is presented as an installation, most recently at the SIGGRAPH 2014 Art Gallery exhibition in Vancouver, Canada (SEE NOTE 02). I am interested in how, through rearranging, the damage to the landscape is analyzed and the topic becomes relatable. People seem to respond to the individual visual parts with amazement as they realize they form a series of instances and represent the traces of a larger story of conflict, war, technology and energy politics. This effectively dismantles the aggregate image of war. (SONTAG, 2003, SEE NOTE 03)**

**NOTE 03**

In REGARDING THE PAIN OF OTHERS, 2003, Sontag investigates the 'pleasure in flinching' when looking at images of violence. (p. 40) She argues that images have become habitual and banal. We have adapted to horror in life, and in images. In photographs of war, the many soldiers represented, with their 'numbed faces and their haggard bodies,' remain an aggregate—anonymous victims. (p. 61) Sontag adds that 'the scale of war's murderousness destroys what identifies people as individuals, even as human beings' and that this 'is how war looks when it is seen from afar, as an image.' (p. 61) Her words strike at the heart of the matter as I see it: the representation of war must address the 'scale of its murderousness,' the degree of its calamity and complexity, and its impact on individual human beings and their specific environments.

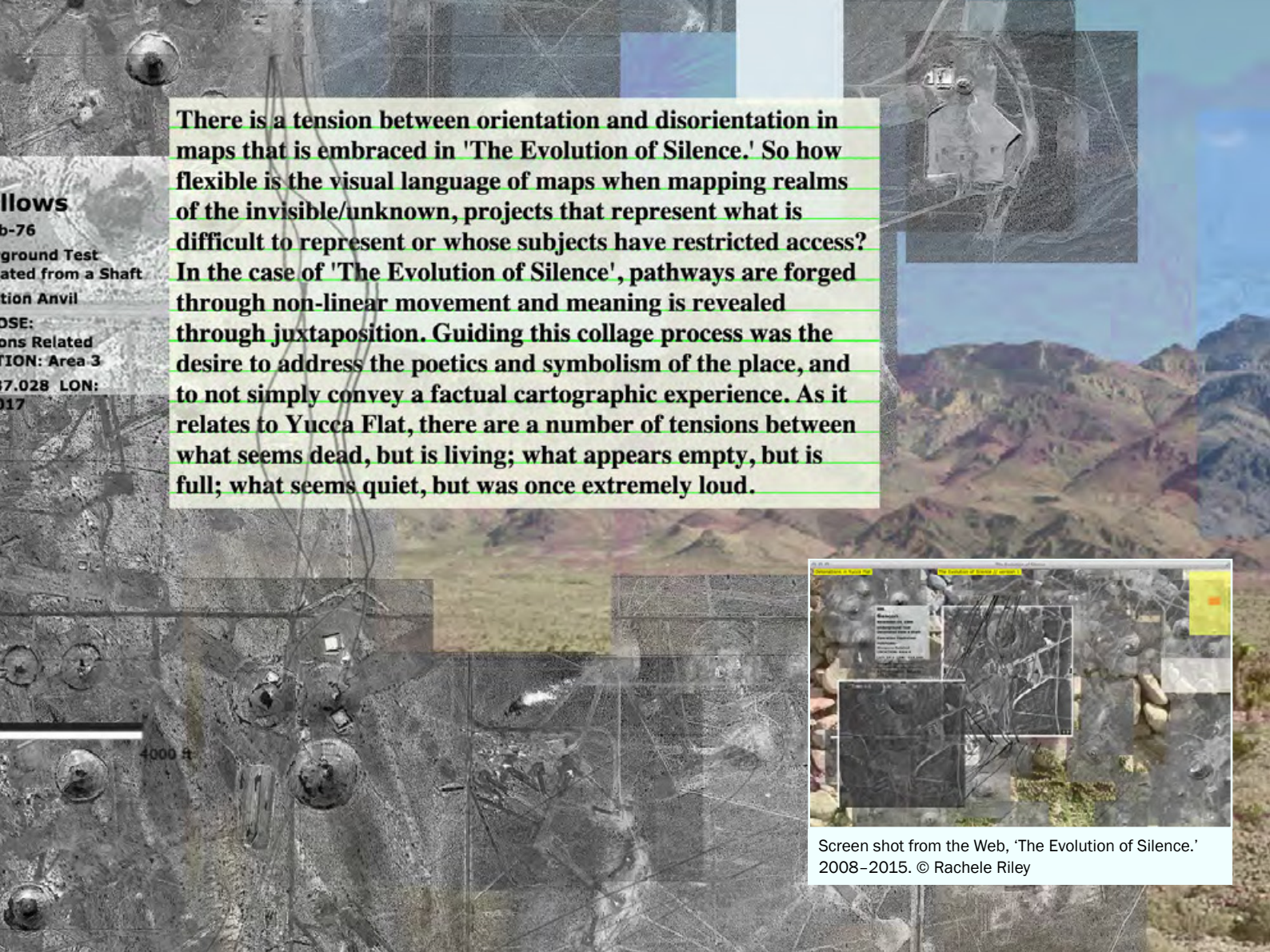
Javascript (jQuery) code excerpted from an exploratory/testing version of the web-based 'The Evolution of Silence.' 2008–2015.  
© Rachele Riley

```
362     myGrid.data[cellIndex][notesKey]
363     outputBuffer += '<div class="cellBackgr
364 }
365
366
367 if(Boolean(myGrid.data[cellIndex][poemKey])){
368     outputBuffer += '<div class="cellBackground4" id="poem_' + cellIndex + '
369 }
```

There is a tension between orientation and disorientation in maps that is embraced in 'The Evolution of Silence.' So how flexible is the visual language of maps when mapping realms of the invisible/unknown, projects that represent what is difficult to represent or whose subjects have restricted access? In the case of 'The Evolution of Silence', pathways are forged through non-linear movement and meaning is revealed through juxtaposition. Guiding this collage process was the desire to address the poetics and symbolism of the place, and to not simply convey a factual cartographic experience. As it relates to Yucca Flat, there are a number of tensions between what seems dead, but is living; what appears empty, but is full; what seems quiet, but was once extremely loud.

**Flows**

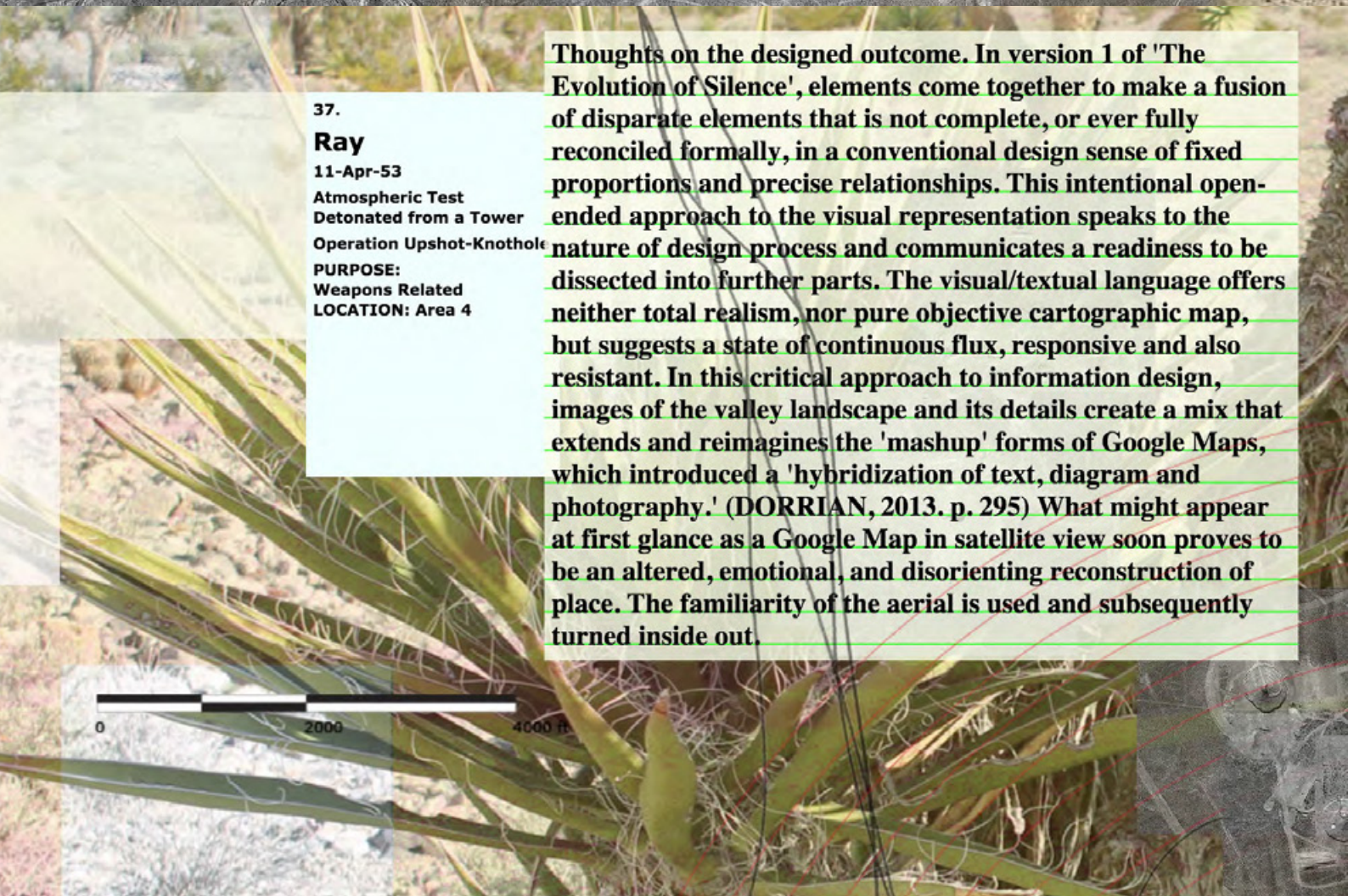
b-76  
 Ground Test  
 ated from a Shaft  
 tion Anvil  
 SE:  
 ons Related  
 TION: Area 3  
 7.028 LON:  
 017



Screen shot from the Web, 'The Evolution of Silence.' 2008-2015. © Rachele Riley

37.  
**Ray**  
 11-Apr-53  
 Atmospheric Test  
 Detonated from a Tower  
 Operation Upshot-Knothole  
 PURPOSE:  
 Weapons Related  
 LOCATION: Area 4

Thoughts on the designed outcome. In version 1 of 'The Evolution of Silence', elements come together to make a fusion of disparate elements that is not complete, or ever fully reconciled formally, in a conventional design sense of fixed proportions and precise relationships. This intentional open-ended approach to the visual representation speaks to the nature of design process and communicates a readiness to be dissected into further parts. The visual/textual language offers neither total realism, nor pure objective cartographic map, but suggests a state of continuous flux, responsive and also resistant. In this critical approach to information design, images of the valley landscape and its details create a mix that extends and reimagines the 'mashup' forms of Google Maps, which introduced a 'hybridization of text, diagram and photography.' (DORRIAN, 2013. p. 295) What might appear at first glance as a Google Map in satellite view soon proves to be an altered, emotional, and disorienting reconstruction of place. The familiarity of the aerial is used and subsequently turned inside out.



**GRID ORGANIZATION**

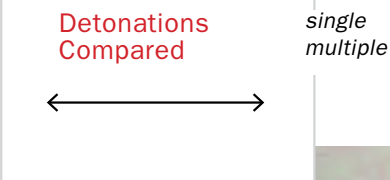
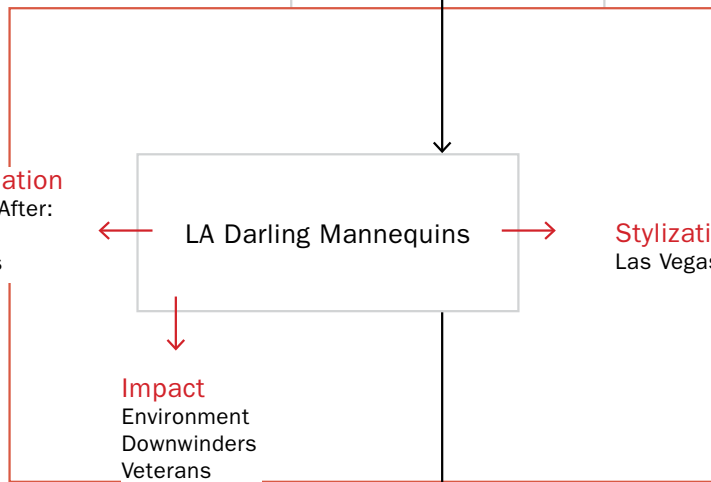
- A
- Time continuum, numbered
- date of detonation

**GEOGRAPHIC ORGANIZATION**

- B
- Geographic location
- site, coordinates
- Continuum A-Z
- name of detonation
- Detonation type
- atmospheric
- underground

**OTHER IDENTIFIERS**

- Purpose of test
- Frequency of activity at site
- Yield of detonation/impact
- Scale/impact (size of crater)
- Notes on detonation



**Landscape Experienced**

**Reveal landscape, simultaneous views: Aerial and Horizon**  
 Rollover main image to reveal pockmarked landscape

**Landscape Explained**

**Realize quantity, scale of destruction**  
 Rollover and scroll up/down to reveal how many craters exist  
**Identify individual craters**  
 Rollover main image, reveal pockmarked landscape, and the names and dates of each nuclear test.  
 Distinction between underground tests, and atmospheric tests; between low and high yields.

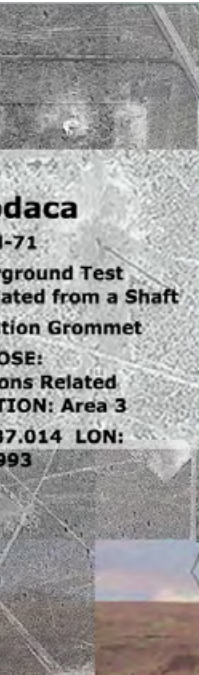
Emotional Layers:  
 Cable drawings, graphic diagramming  
 Video, animation  
 Sound  
 Verbal annotations

**Contrasts**  
 Single and Multiple  
 Visible and Invisible  
 Loud and Quiet  
 Before and After

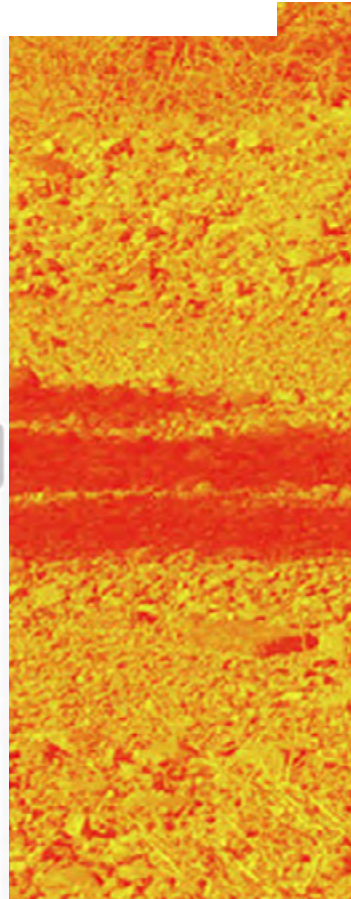
**Landscape Explained**

**View landscape in closer detail**  
 Rollover main image, reveal pockmarked landscape, click on small image to open a (modal window) larger image of the crater (or place of detonation).

Concept diagram for the web-based 'The Evolution of Silence.' 2008-2015.  
 © Rachele Riley



The empty areas, where no images of the tiled view of the landscape appear, are the areas where no nuclear tests occurred. The negative space in the design creates pause in a rhythm of intense information experience. There is subtlety to the desert landscape (for some its value is hard to see). Viewed from afar, as the military might assess it, the Nevada Test Site appears as wasteland, ruined, and its inhabitants displaced. However the landscape is true and alive: shrubs, flowers, yuccas, grasses, desert wildlife. It snowed the last time I visited in December 2013. 'The Evolution of Silence' aims to make this historically significant place more knowable and more public, by bringing attention to the remote area as an important symbol of the impact of war.



In returning to my original research question, I have observed that though the data exists in (largely) publicly-accessible formats, generally it is not a story many U.S. Citizens (or others) know in detail, or perhaps not to the extent that 'The Evolution of Silence' makes palpable and visible. This largely depends on generation, for some lived through the era and remember the time and its events (though even this group usually finds the story of the mannequins surprising). The data on all the detonations, which can be downloaded from the Department of Energy in a multi-page PDF report, is simply not going to affect most people in that particular form. Transforming the experience of this data through the design of images, platforms, and relational structures allows for an engagement that is closer to the acts of research and creation, in which seeking, reading, rearranging, analyzing, generating, and evaluating are at play. I am claiming this type of engagement as also a process of reconciliation. Reconciliation, as I mean it, is to come to terms with the dimension and gravity of a topic and the impact of its dynamics; to make the bewilderment (that things like this could have happened) somehow compatible with a newly formed acknowledgement that things like this did happen. A meaningful engagement, therefore, must be defined by gaining some degree of understanding and by eliciting some form of emotional response, which connects you, the viewer, to the story of a people and a place that are elsewhere.



Detail of drawings, 'The Evolution of Silence.' 2008-2015. © Rachele Riley

189.  
**Humboldt**  
29-Oct-58  
Atmospheric Test  
Detonated from a Tower  
Operation Hardtack II  
PURPOSE:  
Weapons Related  
LOCATION: Area 3

In this project, the design reflects the nature of research, acknowledgement, and reconciliation processes. 'The Evolution of Silence' offers opportunity for anyone to experience the data of this restricted place and to conduct their own research into what is presented, thereby participating in an act of creating knowledge. Contributions made by others (in particular interaction with the project in a public space), through their rearrangement and reading of the material, add to the many traces of exploration and analysis this landscape inspires. The engagement brought about by the design of the project enriches a broader investigation into the representation of conflict by making a small provocation into the status quo, in the sense that the viewer is invited to question the landscape's data. When design provides for active interpretation of conflict, data, and space, it can lend new perspective on our environment and expose the dynamics of the world.

atas Abilene Able Abo Absinthe Ace Acushi Adze Agile Agouti Agrini Ahtanum Ajax Ajo Akavi Akbar Alem  
 a Apple-1 Apple-2 Apshapa Arabis-Blue Arabis-Green Arabis-Red Arikaree Armada Armadillo Arnica-Violet  
 e Avens-Asamlte Avens-Cream Azul Baccarat Backgammon Backswing Badger Baker Baker Baltic Bandico  
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 as-Chacon Truchas-Chamisal Truchas-Rodarte Trumbull Tub-A Tub-B Tub-C Tub-D Tub-F Tulia Tuloso Tun-A  
 mber Uncle Valencia Valise Vat Vaughn Velarde Verdello Vermejo Victoria Vide Vigil Ville Villita Vise Vito  
 e Whiteface-A Whiteface-B Whitney Wichita Wilson Winch Wolverine Wool Worth Yannigan-Blue Yannigan-

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**Credits**

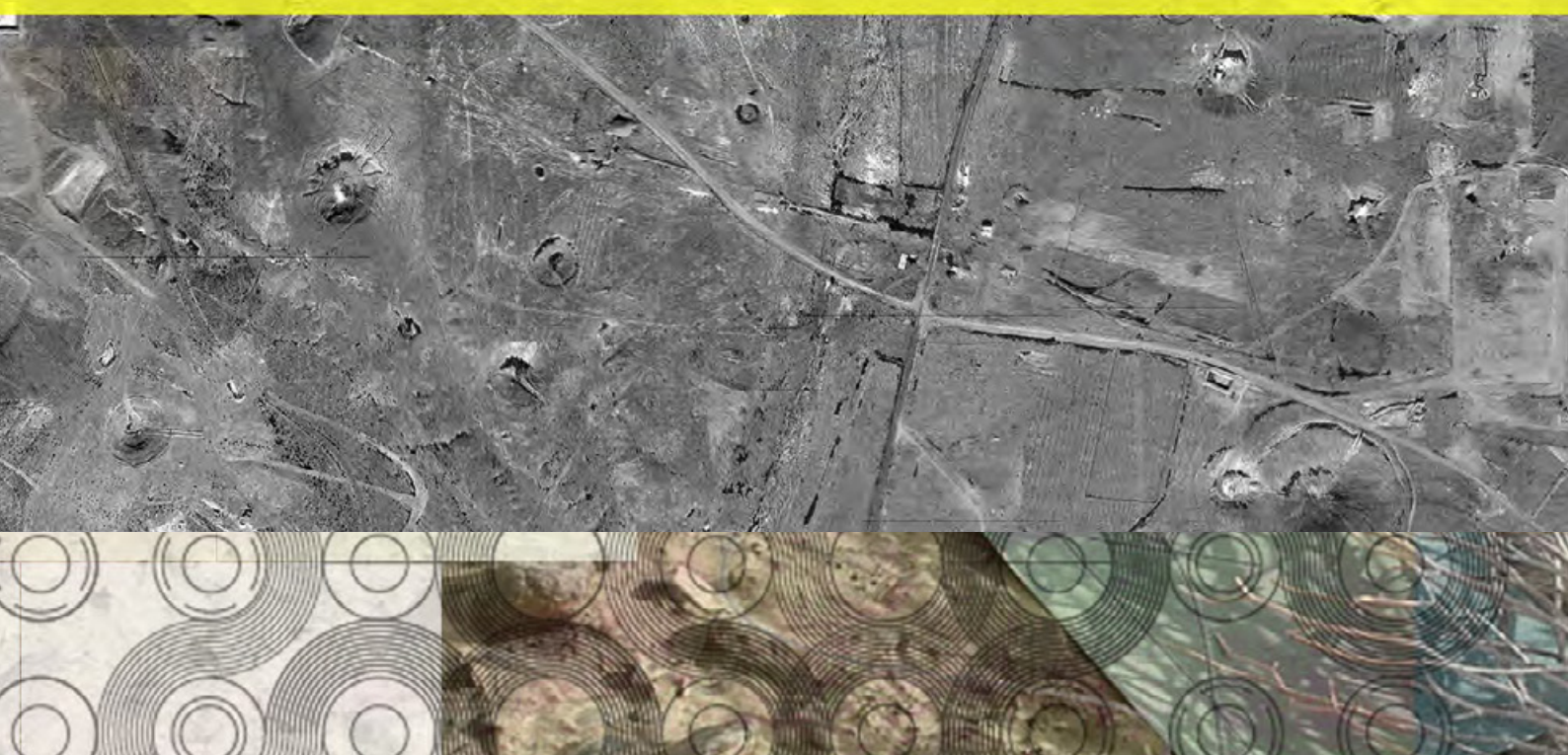
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Layout: Concept and Graphic Design by Rachele Riley.

‘The Evolution of Silence’ has been made possible in part with grants from the DigitalGlobe Foundation, the University of the Arts in Philadelphia, the University of North Carolina Charlotte, the USA Projects Open Match Fund, and with individual contributions made directly to the project via Hatchfund.

Archival photos, maps, documents and artifacts are courtesy of the DigitalGlobe Foundation, U.S. Department of Energy, United States Geological Survey, National Nuclear Security Administration, Nevada Test Site Historical Foundation, Las Vegas News Bureau, Cahlan Research Library (Nevada State Museum), Special Collections Library at the University of Nevada Las Vegas, Nuclear Testing Archive, National Atomic Testing Museum, National Archives, and Library of Congress.

Blenton Bobac Bobstay Bogey Boltzm  
 n Buff Bulkhead Bullfrog Bunker Burzet  
 Carp Carpetbag Carrizozo Cashmere C  
 (Chavez) Cheedam Chenille Chess Ch  
 Colmor Commodore Concentration Co  
 oypu Cremino Cremino-Caerphilly Crep  
 quiri Dalhart Daman I Danablu Dauphin  
 Dovekie Draughts Drill (Source-Lower)  
 Ess Estaca Fade Fahada Fajy Fallon Fa  
 ob-Green Fob-Red Fore Forefoot Forest  
 Galileo Garden Gascon Gazook Georg  
 High Altitude) Haddock Handcar Handic  
 t-Emerald (Green) Hearts Heilman Herr  
 n King Hutch Hutia Hyrax Iceberg Ildrin  
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 Lampblack Lanpher Laplace Laredo La  
 arsilly Marvel Mataco Mauve Maxwell M  
 hans-B Monero Monterey Mora Morgan  
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 rd Packrat Paisano Pajara Palisade-1 Pa  
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 ee Ponil Portmanteau Portola Portola-L  
 e Rib Ringtail Rio Arriba Riola Rivet I R  
 Sapello Sappho Sardine Satsop Satz S  
 weed-D Seaweed-E Seco Sedan Seersuc  
 Spider-B Spoon Sprit Spud St. Lawren



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Rachele Riley is an artist, designer, researcher and educator, and is currently Assistant Professor in the School of Art and Design at the University of Illinois at Urbana-Champaign (USA). Her multimedia work investigates the representation of conflict and its reconciliation within culture, and has received support through grants from the DigitalGlobe Foundation, the University of the Arts in Philadelphia, the University of North Carolina Charlotte, the University of Illinois Urbana-Champaign, and the Open Match Fund from USA Projects/Hatchfund. Rachele's print, drawing, video, and Web-based works have been exhibited in the U.S. and abroad, and published in *Leonardo*, *Journal of Arts, Sciences, and Technology* (2014), *Print Magazine*, *Regional Design Annual* (2008) and *Motion Design* (Matt Woolman, Rotovision, 2004). In April 2014, 'The Evolution of Silence' was selected as an Official Honoree in the 18th Annual Webby Awards in the NetArt category. Rachele has been Artist-in-Residence at the Kimmel Harding Nelson Center for the Arts in Nebraska and the Virginia Center for Creative Arts, and (as part of a DesignInquiry project in Fall 2014) at the Museum of Contemporary Art, Detroit. Abroad, her work has been presented at the 'Praxis and Poetics' exhibition at the Baltic Centre for Contemporary Art in Gateshead, UK (September, 2013), at the 2014 SIGGRAPH Conference Art Gallery exhibition, 'Acting in Translation' in Vancouver, Canada (August 2014), and at the NORDES: Design Ecologies Exhibition in Stockholm, Sweden (June, 2015). She served on the Board of Directors for DesignInquiry from 2013–2015—a non-profit educational organization devoted to researching design issues in team-based gatherings. Rachele holds a MFA in Design/Visual Communication from Virginia Commonwealth University (Richmond, VA), a Vordiplom in Kommunikationsdesign from the Burg Giebichenstein Kunsthochschule Halle (Germany), and a BS in Studio Art from New York University (New York, NY).