

## Design Proposal Template:

**School:** Middle College High School    **State:** California    **Division:** High School

**Team Members' Names:** Sudinma Thapa and Emily Au

**Project Title:** Readers should have a general sense for what the project is about and want to read more. (20 word maximum)

**Decon:** *Dual system offering an emergency decontamination tool for Chemical Crowd Control Agent (CCCA) exposure and app for protestor mobilization.*

**Inequity Being Addressed:** Describe the inequity that you will attempt to address with your proposed solution, and why you chose this inequity. Students are able to consider a global perspective related to their inequity. (75 word maximum)

As movements rise, so does the unlawful repression of free speech. Across the SF Bay-Area, protest violence has increased due to tensions between authorities, protestors, and counter-protesters. A prime constituent of this is the deployment of Chemical-Crowd-Control-Agents (CCCAs). Decon addresses the physical health risks and social consequences of CCCA enforced speech suppression by promoting peace, justice, and strong institutions (UNSDG#16) to ensure responsive, inclusive, participatory, and representative decision-making at all levels (UNSDG-Target#16.7).

**Community Research and User Identification:** Explain the process used to identify the inequity and select your user. Include any research done to identify issues in your community and understand which groups face challenges because of these issues. (150 word maximum)

Our research began by surveying a focus group of 12 activists from local organization, Reimagine Richmond (RR). We analyzed the current safety climate surrounding protests, evaluated the interpersonal impact of CCCAs, and interpreted future safety concerns. Within the group, 58% reported direct CCCA exposure, often resorting to nonsterile, outdated decontamination methods like milk or bottled water. Additionally, 100% of activists believed violence against protestors is rising, with 91% experiencing physical violence during protests.

We expanded our research through interviews with multimedia journalist, community organizer, and CCCA victim, Denis P. He noted that authorities often issue vague evacuation warnings without clear timeframes before deploying CCCAs. This leads to prolonged exposure which results in respiratory inflammation, chemical burns, and glaucoma. Finding limited aid for the medical, mental, and legal after-effects of such exposure, we further explored support-hubs across California to integrate into Decon. In turn, centering evidence-based, community-focused health and safety interventions.

**User Profile:** Provide a detailed description of your selected user. Include information about challenges they face, how those challenges impact their lives, and specific project needs based on user feedback. (150 word maximum)

Our selected user was established from the RR focus-group data alongside our 1-1 meetings with Denis P. Identified as an activist living in a politically charged environment, our user contends with both the state-sanctioned and fractional (counterprotester-on-protester) deployment of CCCAs in situations of protest. Additionally, they struggle to find sterile, scientifically-backed emergency decontamination solutions, leaving them vulnerable to temporary physical distress that may lead to long-term health complications.

Beyond physical harm, limited communication with distant activists and immunocompromised individuals alongside the lack of medical, mental, and legal support surrounding CCCA exposure further strains our user's activism and well-being. This forces them to simultaneously balance advocacy and crisis response without the proper resources, weakening coordination, threatening movement sustainability, and ultimately hindering representative decision-making (UNSDG-Target#16.7).

This data analysis revealed the need for a coordinated two-system solution to address both the health issues and social challenges resulting from CCCA exposure.

**Project Goals:** List your project goals and explain how these goals will address the inequity. Project goals should define the desired outcomes, not specific features of the proposed solution. (150 word maximum)

Decon's project goals are:

#### **Emergency relief**

- Provide immediate decontamination of the outer organs from CCCAs through an automated device.
- Alleviate short-term symptoms (difficulty breathing, skin irritation, and blurred vision) in order to prevent the development of long-term health issues (respiratory inflammation, chemical burns, glaucoma) resulting from exposure.
- Aid temporary incapacitation caused by CCCAs so that the user can move to safety.
- Replace non-sterile decontamination methods with scientifically involved solutions.

#### **Community mobilization**

- Facilitate communication channels between activists and ensure that those who are immunocompromised and/or have respiratory issues receive real-time updates about the deployment of CCCAs.
- Connect to region specific support hubs in order to aid prevailing medical, mental, and legal challenges.

#### **Accessibility and Advocacy**

- Ensure user friendly experience with visual support.
- Educate the user about the historical and health concerns relating to CCCAs.
- Promote safety in protests.
- Uplift freedom of speech and the right to peacefully assemble in protest.

**Proposed Solution:** Describe your proposed solution, including any innovative and unique features, and explain how this solution will address your users' needs and the inequity they face. (150 word maximum)

Engineered for portability and rapid response, the Decon device delivers emergency decontamination from CCCAs at the press of a button. This permits Decon to disperse a continuous stream of saline solution onto vital outer organs, quickly relieving short-term symptoms and incapacitation while reducing the risk of long-term complications. The integrated red LED-light illuminates the device and aids accessibility if the user's visibility is compromised.

Moreover, the main interface of the Decon app consists of four pages.

**Page 1:** Posting Network which utilizes the cloud system, enabling the user to share updates about their safety on any OS device.

**Page 2:** Support Hub that connects to a regionally sorted list of hospitals, helplines, and lawyers guilds to address prevailing medical, mental, and legal challenges.

**Page 3:** Device Guide and instruction manual with pictures.

**Page 4:** Information Center which educates the user on the historical context and health implications of CCCAs.

**Initial Design:** A single graphic of your first design idea with key features adequately labeled. It should be easy to understand and the reader should have a general understanding of how the prototype functions by looking at the graphic. Max size 8.5" x 11"

### 1 DECON DEVICE



**TRANSPARENT BOTTLE**  
 Stores saline solution, can be refilled by twisting counterclockwise to remove

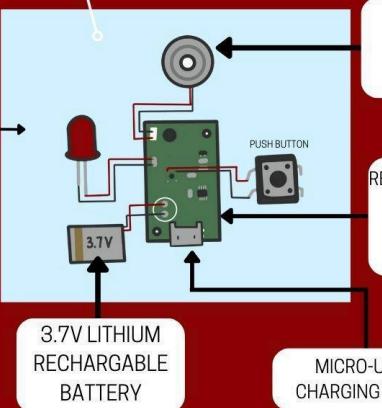
**PUSH BUTTON**  
 Turns on device, powering LED and piezo



Clicking the logo of a resource leads to their designated website

### 2 INSIDE COMPONENTS

**LED LIGHT**  
 Aids visual accessibility if users visibility is compromised by chemical agent



**PIEZO ATOMIZER**  
 Vibrates in ultrasonic frequencies to disperse saline solution

**REPURPOSED HUMIDIFIER CIRCUIT BOARD**  
 Designed to operate the piezo

**3.7V LITHIUM RECHARGEABLE BATTERY**

**MICRO-USB CHARGING PORT**

### 3 DECON APP



**SUPPORT HUB**



**INFORMATION CENTER**



**SIDEBAR**

VIEW ALL PAGES



Resources for protesters to receive legal, mental, and physical help

**DEVICE GUIDE**



**VIEW POSTS**



**POSTING NETWORK**

**WRITE A POST**