

# Stun Gun Self Defense Glove

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# Women's Safety Concerns

**Gender-based violence**  
more common than you think

In the European Union, since the age of 15:

**1 in 3**

women has experienced  
**physical** and/or  
**sexual violence**

**1 in 2**

women has experienced  
**sexual harassment**

**1 in 20**

women has been **raped**

**1 in 5**

women has experienced  
**stalking**

**95%**

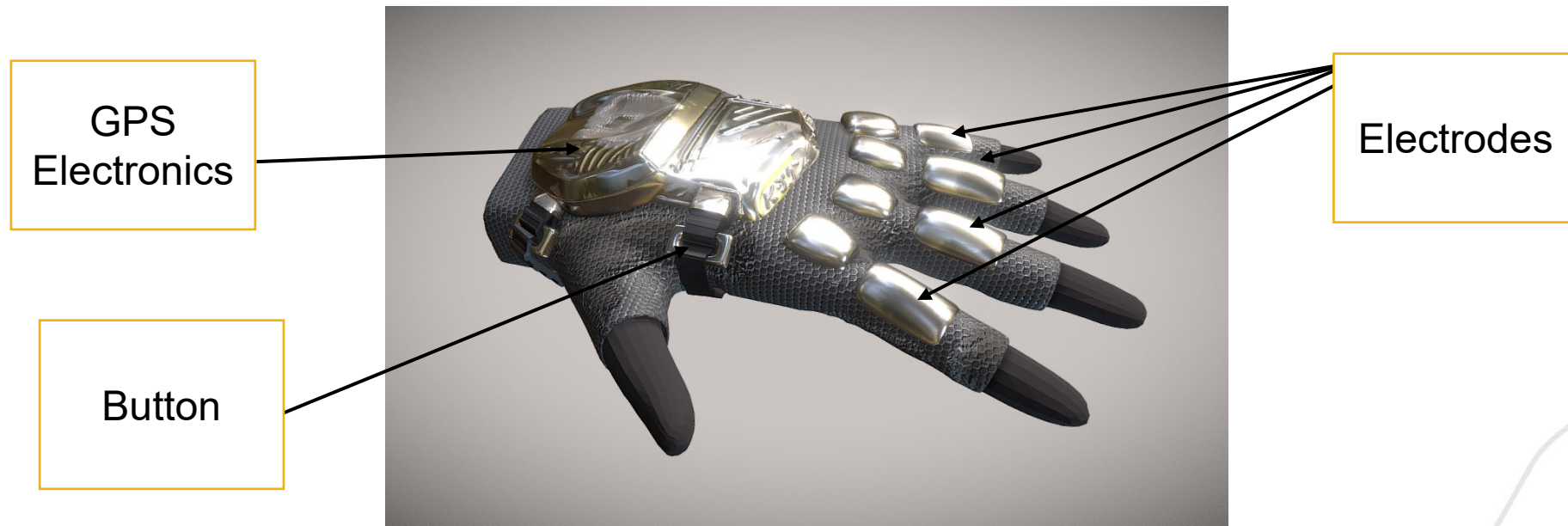
of victims **trafficked**  
for **sexual exploitation** in the EU are women



Sources: European Union Agency for Fundamental Rights, Violence against women: an EU-wide survey - Results at a glance, 2014  
Eurostat, Trafficking in human beings, 2015  
Image: Margaret Jone Wollman/Shutterstock.com

# Project Overview

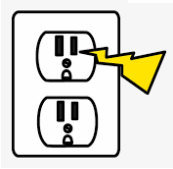
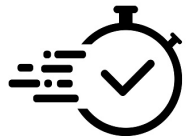
- Self-defense wearable to protect user in dangerous situations
  - Primary client is women, can be expanded in future
  - Electrodes dispense shock on contact
  - GPS location sent to emergency contacts



# How you'd use it



# Design Requirements



Technical Requirement	Target/Limits	Reasoning
Insulated from User	<1 nA in user	Insulation is important to protect the user from accidental electrocution or shocking.
Emergency Contact Time	100 ms	Contacts should be notified as soon as possible so that help can reach the user quickly.
GPS Location Accuracy	0.2 mi	A higher location accuracy can guarantee higher chances of the user's emergency contacts and the police locating them.
Current Discharge	5mA - 7 mA	The higher the current discharge, the more damage the attacker receives. However, current cannot be too high to cause permanent damage to the attacker.
Coverage of Stun Gun	10 in <sup>2</sup>	The wider the coverage of the stun gun, the more pain the attacker will feel, which should reduce chances of the attacker attacking a second time.
Product Dimension	3 x 18 in <sup>2</sup>	The product dimension needs to fit the user so it does not slip off and must be compact, so it is not bulky for the user to wear.

# User Requirements



Technical Requirement	Target/Limits	Reasoning
Low Power Consumption	0.22 Watt-hours	Longer lasting battery life so that users are protected for an extended period.
Lightweight	200 g	Not cumbersome for the user to wear so they are more likely to wear it for protection.
Affordable	\$124 prototype cost	To expand product outreach, the product should be reasonably priced so that more women can afford it as a self-defense object.

# Technical Approach

Transformer steps up the voltage from 12 V to 7.58kV (open circuit value).

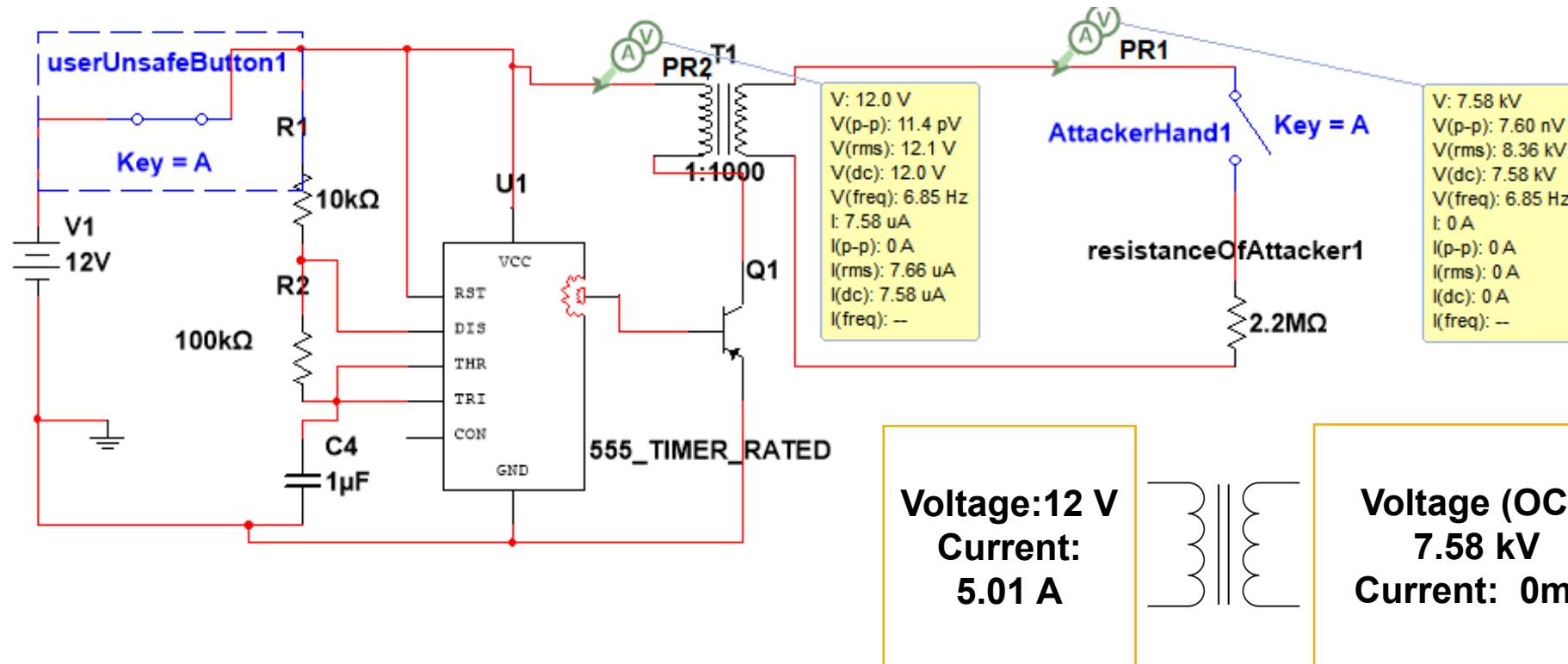


Fig 1. Transformer voltage prior to discharge



# Technical Approach

When contact is made with the attacker the circuit is completed bringing the voltage down and causing current to discharge

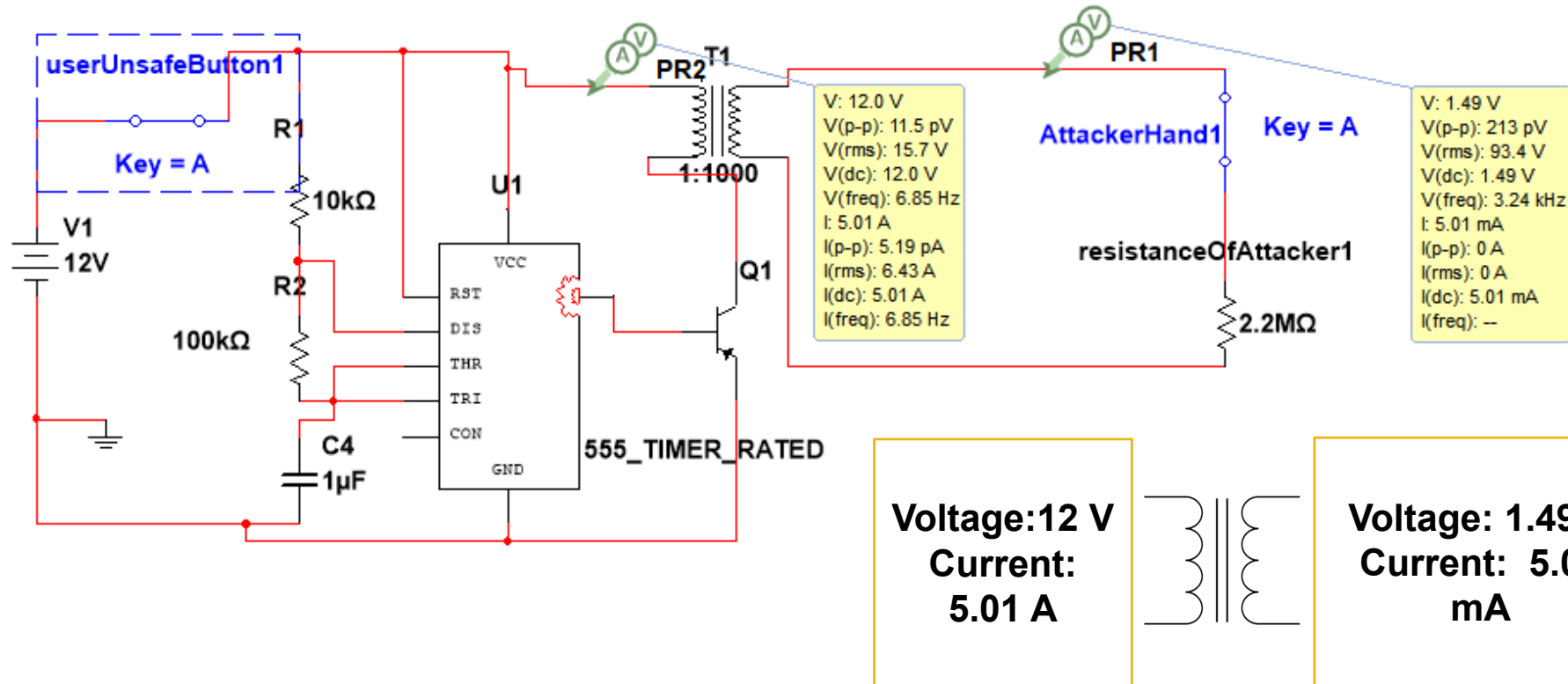


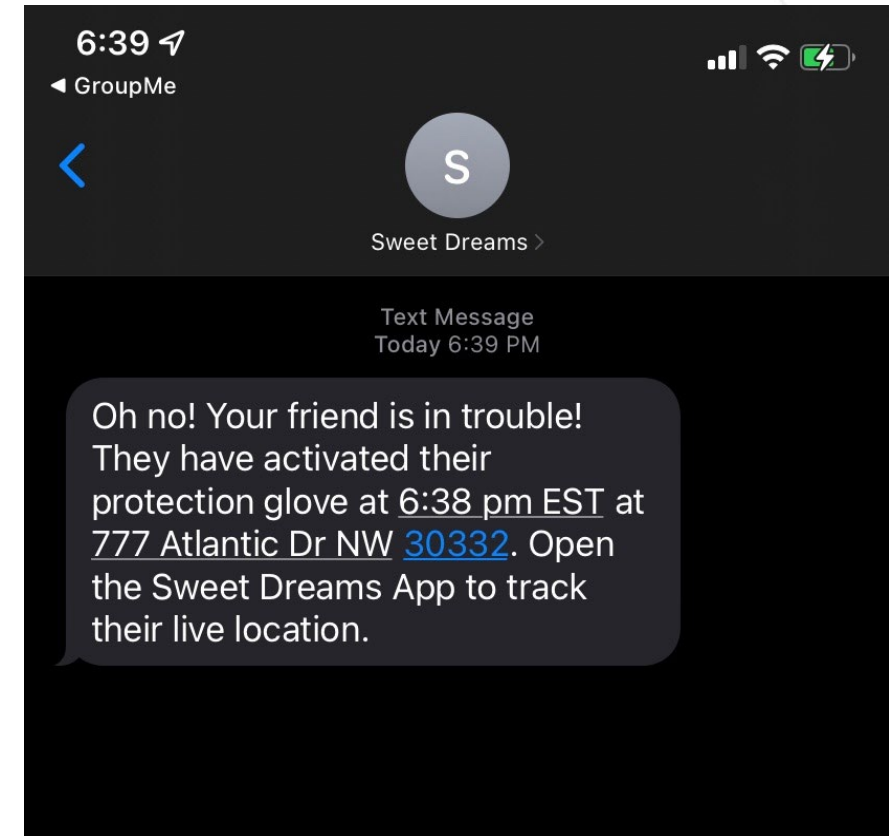
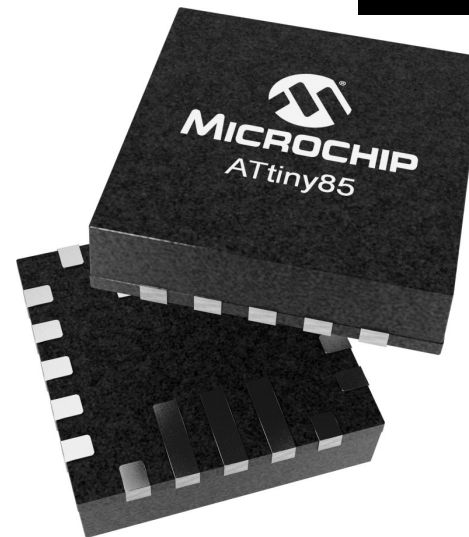
Fig 2. Transformer at activated AttackerHand1 Output



# Technical Approach

## Microcontroller – For Bluetooth and GPS tracking

- ATtiny85 – 8-bit
  - Low power
    - 1 MHz, 1.8V: 300  $\mu$ A in active mode
    - 1.8V: 0.1 $\mu$ A in power-down mode
  - 8KB Flash RAM, 512 bytes SRAM
  - Universal Serial Interface
  - Six programmable I/O lines
  - TINY: 4x4mm



# Budget

Components Groups	Total Price
Microcontroller	\$9.50
Stun Gun Circuit	\$61.19
Battery Recharger	\$6.29
GPS + Bluetooth	\$17.00
Estimate Shipping	\$100.00
Estimate PCBs	\$200.00
Glove Materials	\$85.54
General Supplies	\$35.27
Stun Gun	\$19.99
<b>Grand Total</b>	<b>\$525.28</b>

# The Difference

- Current Products Women Use:
  - Pepper Spray - restricted at events, clunky
  - Tasers – illegal in states
  - Brass Knuckles – restricted at events
  - Cat Claws - restricted at events
- The Future
  - Discrete protection for women's convenience and safety

