

Construction and user manual

POETIC BAZOOKA

Step-by-step, history, precautions
& applications

Cauê Maia



Poetic Bazooka is a DIY portable analog slide projector created by Cauê Maia to realize poetic interventions in public spaces and other artistic and pedagogical purposes.

Reusers must give credit to the creator, in which case they can distribute, remix, adapt, and build upon the Poetic Bazooka in any medium or format, for noncommercial purposes only.

Read read all instructions before starting

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Text, illustrations and graphic design
Cauê Maia

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Coletivo Transverso
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The **Poetic Bazooka** is a DIY projector. Its operation depends on three elements connected to the body of the device: flashlight, magnifying glass and slide. Materials and tools can be replaced according to availability and expected results.

Its lightness, reduced proportions and rechargeable batteries offer autonomy of movement. The light projection leaves no material traces, which makes it impossible to suppress it on charges of vandalism. The **Poetic Bazooka** is portable and produces ephemeral results, which puts it in a position to act on the front line of urban poetic guerrilla warfare.

Its low cost compared to other projectors also makes it possible to use it as a teaching resource in schools and other isolated spaces or those without electricity, as well as for studying optics, geometry, engineering and other areas.

Work carefully, avoid accidents.



Projection with Poetic Bazooka, São Paulo 2022. Photo by Aline Yumi.



Workshop to build Poetic Bazookas during FestaA! at Sesc Osasco, 2018.



Bazookas used by the A Craco Resiste Collective, 2017. Resistance Collective.

Tools

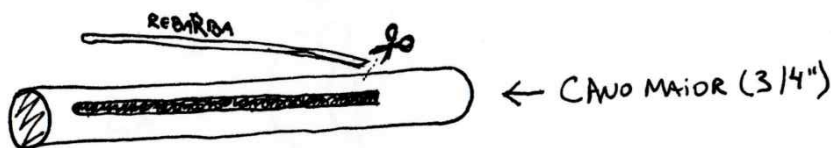
- Drill with 4.5mm and 6.5mm bits
- Micro-screwdriver with cutting disc
- Screwdriver
- Philips screwdriver
- Hexagon socket wrench
- Hacksaw
- Pliers
- Stiletto
- Cutting table
- 30cm ruler
- Compass
- 0.1 overhead permanent marker, for producing slides by hand
- Computer with Illustrator and inkjet printer, for producing printed slides.

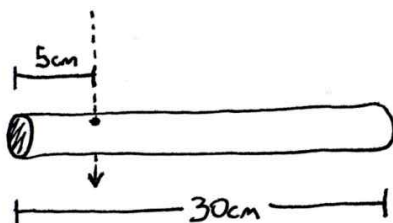
Materials

- 1 LED flashlight with focus adjustment, known as a tactical or military flashlight, sold in electronics, fishing, hunting or camping stores. The more powerful it is, the greater the projection range.
- 1 magnifying glass 10cm in diameter, with a glass lens and plastic handle;
- 1 PVC pipe (conduit) 1/2" (half an inch) in diameter and 30cm long;
- 1 PVC pipe (conduit) 3/4" (three quarters of an inch) in diameter and 30cm long. The smaller diameter pipe (1/2") needs to enter and slide inside the larger pipe (3/4") without locking. There are manufacturing differences. You may need to test a pair that fits before buying;
- 2 3/4" metal clamps;
- 1 1/2" metal clamp;
- 4 screws (A) 4cm long and 4.5mm in diameter;
- 4 washers;
- 4 wing nuts for 4.5mm diameter screws;
- 2 screws (B) 2.5cm long and 6mm in diameter;
- 2 hexagon locking nuts with a diameter of 6mm;
- 1 insulating tape;
- 2 nylon seals;
- 2 sheets of sandpaper;
- 1 sheet of A4 overhead projector transparency;
- 1 sheet of A4 triplex 300g paper;

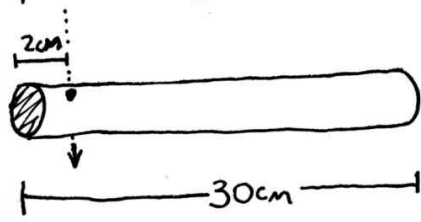
Step-by-step

1. With the drill and a 4.5mm drill bit, drill through the smaller pipe (1/2") 5cm from the edge. The drill bit should go through the diameter of the pipe and come out on the other side.
2. Drill through the larger pipe (3/4") with the 4.5mm drill bit, 2cm from the edge. The drill bit should go through the pipe and come out the other side.
3. Use the screwdriver to widen just one of the holes in the smaller pipe (1/2"). Make sure the head of the screw (A) goes through the hole.
4. Use the screwdriver to widen just one of the holes in the larger pipe (3/4"). Make sure the head of the screw (A) goes through the hole.
5. With a ruler and pen, draw a 21cm line on the larger pipe (3/4"), parallel to the sides, from the hole that hasn't been widened towards the opposite edge.
6. Make two parallel longitudinal cuts with the cutting blade of the micro-grinder on the larger pipe (3/4"), starting from the hole that has not been widened and following the line drawn in step 6. The distance between the parallel lines should be approximately 5mm, enough for the screw (A) to run inside the channel without locking.
7. Fit the smaller pipe (1/2") inside the larger pipe (3/4"), aligning the holes enlarged in steps 4 and 5. Most of the smaller pipe (1/2") should stick out.

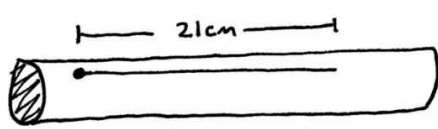




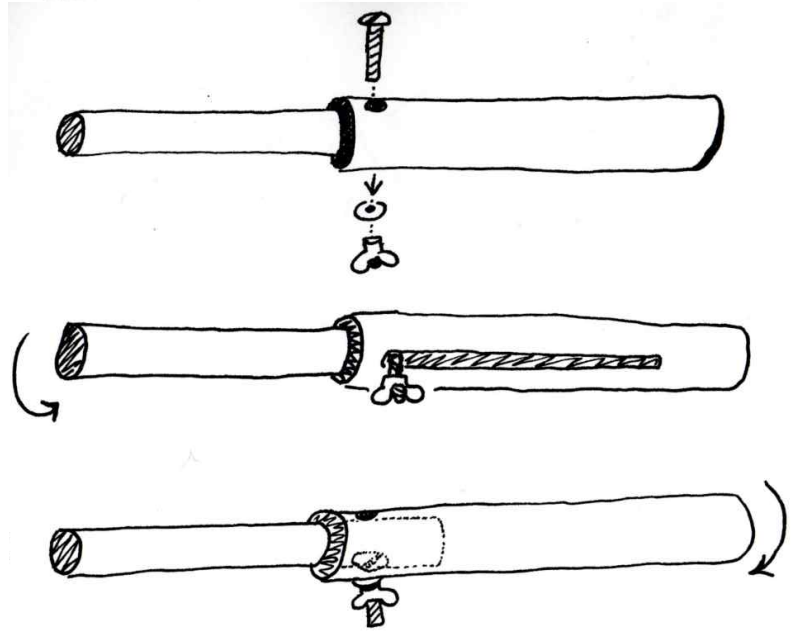
← CANO MENOR (1/2")



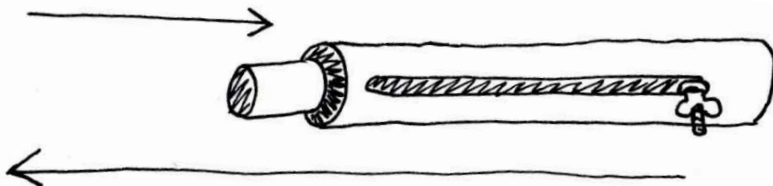
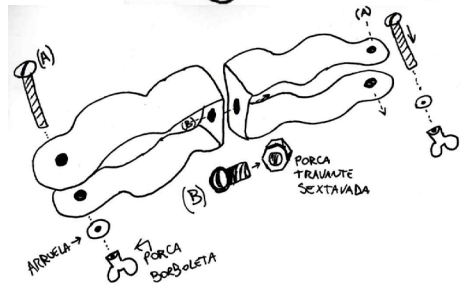
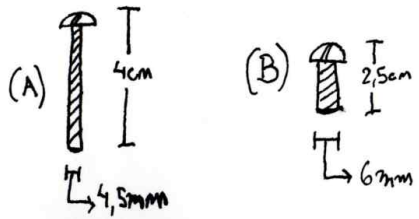
← CANO MAIOR (3/4")

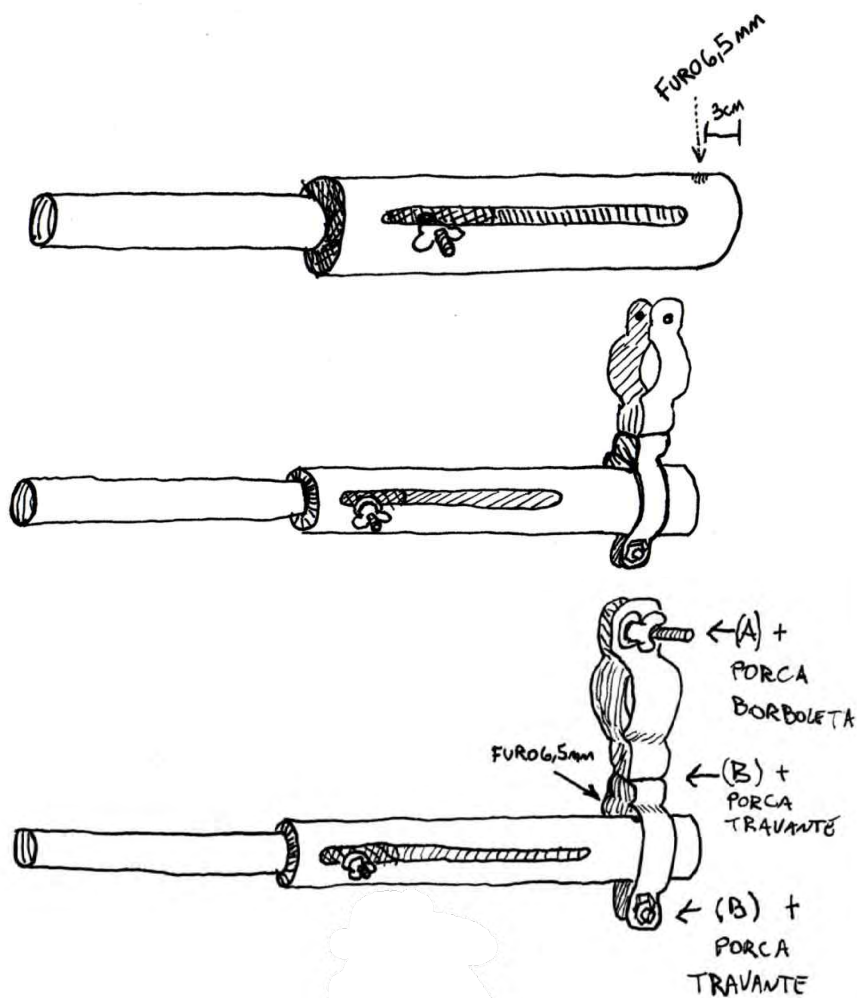


← CANO MAIOR (3/4")

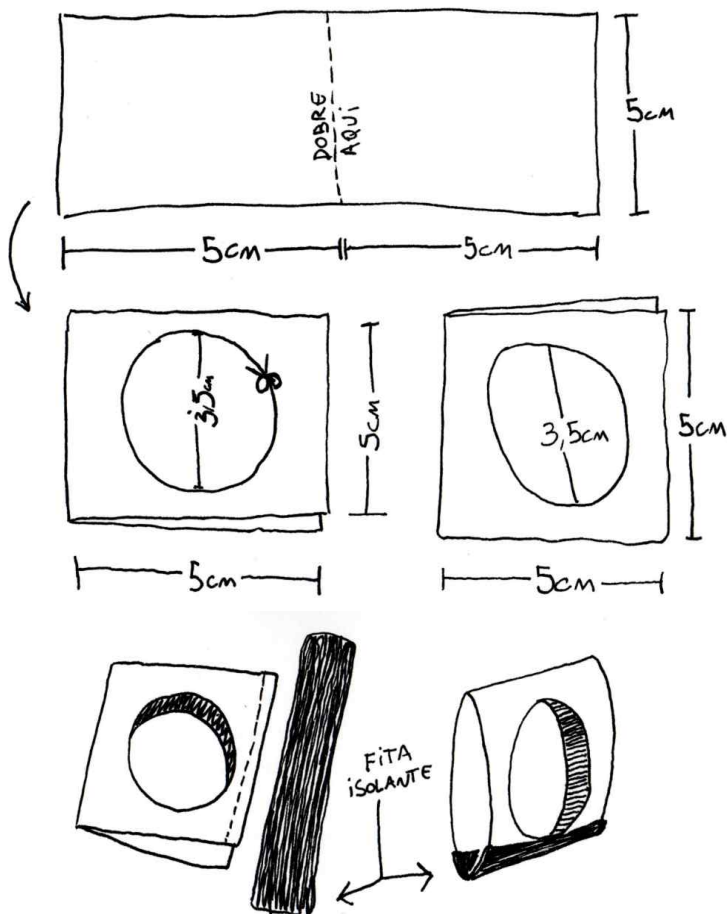


8. Insert the screw (A) through the enlarged hole, passing through both pipes and coming out through the channel of the larger pipe (3/4"). When the head of the screw (A) locks inside the smaller pipe (1/2"), attach the washer and wing nut.
9. Leaving the wing nut with a small gap, make sure that the screw runs unhindered inside the channel.
10. Aligning the two 3/4" clamps, fit the screw (B) into the hexagonal lock nut and tighten with the wrench, fixing the clamps against each other at the base. Tighten securely, making sure that the clamps are aligned and do not rotate.
11. Use the drill with the 6.5mm bit to drill a hole in the larger pipe (3/4"), 3cm from the edge opposite the two holes drilled in step 3. Do not cross the pipe on the other side. This hole must be perpendicular to the screw (A) in the channel.
12. Fit the set of clamps to the larger pipe (3/4"), as shown in the image opposite. Make sure that the tip of the screw (B) that holds one clamp to the other has entered the hole drilled in step 11. The chassis is ready.

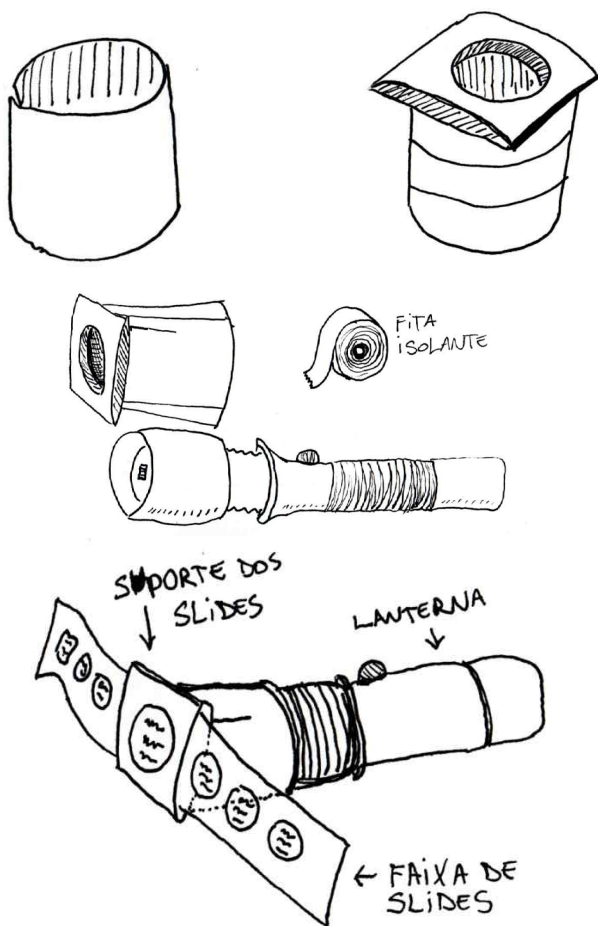




13. Cut two 10x5cm strips from 300g triplex paper. The strip should fit the diameter of the front of the lantern. Adjust the measurements to suit your lantern.
14. Fold one of the strips in half to form a 5x5cm square. Draw a circle with a diameter of 3.5cm in the center of the square with the compass. With the stylus, cut the circle in the same position on both sides of the folded paper. This will be the support for the slide strip.
15. Tape the loose parts of the strip opposite the fold. Tape the inside and outside of the strip carefully so as not to obstruct the opening through which the slide strip will pass, or the circle through which the image will be projected.

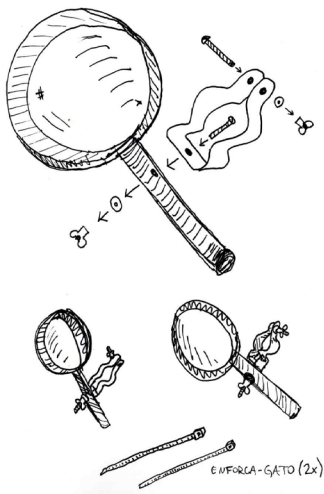


16. With the other strip, make a tube around the front of the lantern. Make sure the tube fits into the lantern and doesn't fall out, and secure it with electrical tape. This will be the base of the slide holder. Reinforce the structure with insulating tape.
17. Fit the slide holder into the base made in step 17, then secure with insulating tape. Reinforce the entire structure with tape, without obstructing the slide track or the circular opening of the holder. Don't leave any burrs, which can make it difficult for the slides to slide.
18. Fit the base of the slide holder to the front of the lantern and the lantern to the clamp on the chassis. Always keep the focus of the flashlight pulled as far forward as possible.



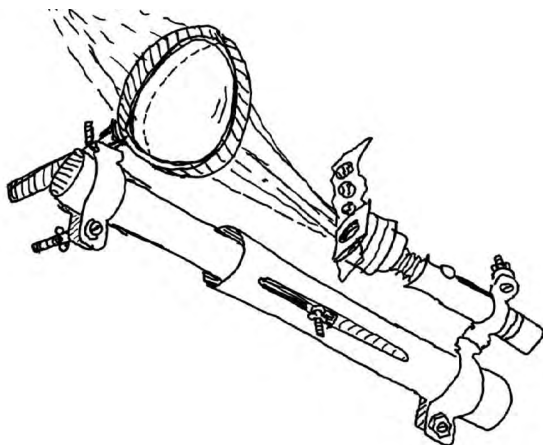
19. Now for the base of the magnifying glass. With the drill and a 4.5mm drill bit, drill through the magnifying glass handle two centimeters below the junction with the lens. The hole should go through the handle in a line parallel to the lens. The piece is delicate. Drill carefully.
20. Pass the screw (A) through the hole in the base of the 1/2" clamp and then through the hole in the magnifying glass handle. Leave the opening of the clamp perpendicular to the magnifying glass handle, as in the image opposite. Attach the washer and wing nut to the screw, securing the magnifying glass from the outside of the base of the clamp. Slip the seals inside the 1/2" clamp and outside the magnifying glass. Cut off any leftover seals.
21. Fit the base of the magnifying glass onto the end of the smaller pipe (1/2"), with the center of the lens aligned with the lantern. Tighten the wing nut.
22. The Poetic Bazooka projects text and images in black or color. The higher the contrast, the greater the sharpness and range of the projection, since colors absorb part of the light. You can use old slides or print new ones on overhead transparencies. To lay out the slide strips, use Illustrator or similar. You can also write with a fine-tipped permanent marker on acetate and other transparent materials. Slide strips optimize the transition between sentences. An A4 overhead projector transparency in landscape format can fit 4 strips, each 4cm high. Each strip fits 8 to 9 slides side by side. Align the center of the slides with the center of the strip as shown in the example. Each slide has a projection area of 2.5cm in diameter. After printing, cut out the horizontal strips. Make sure that the strips go inside the slide holder from steps 14 to 18. If you want to do it by hand later, knowing the limits of the projected area, you can print the score blank, just with the circles aligned.

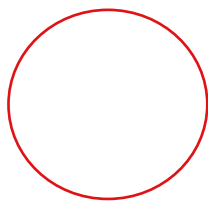
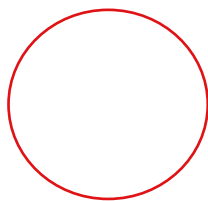
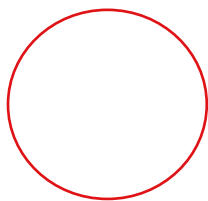
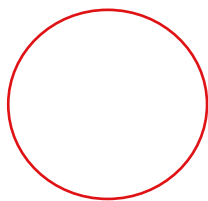
Your Poetic Bazooka is ready! Use it wisely.





*Poetic Bazooka with the creator at National Arts Foundation-São Paulo, 2022.
Photo by Rogério Padial.*





**MÍDIA
OMITE
POVO
BERRA**

**CALMA
PORRA**



**É SÓ
POESIA
DELEGADO**

**O POEMA
MUDA O
SENTIDO DO
CAMINHO**

**O CAMINHO
MUDA
O SENTIDO
DO POEMA**

**GENTE
PASSA
TEMPO
SEGUE**

**FOICE O
TEMPO**

**AQUI
CABERIA
UM POEMA**

**NÃO CREIA
EM TUDO
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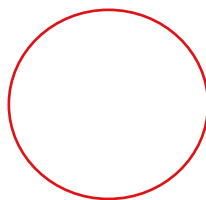
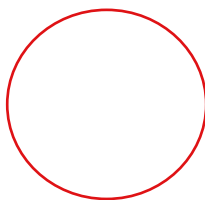
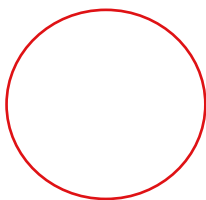
**NÃO CREIO,
MAS NÃO
DUVIDO**

(DES)VENDE-SE

PARTITURAS PARA BAZUCA POÉTICA EM TRANSPARÊNCIA DE RETROPROJETOR

ALTURA DA FAIXA DE SLIDES - 4cm

**ÁREA
PROJETÁVEL**
2,5cm Ø



**PENSE
NOS
PORQUÊS**

**DÊ
FLORES
AOS
VIVOS**

**AME
QUEM
QUEIRA**



**SOMOS TODOS
ESTRANGEIR^{OS}**

**IMPUNIDADE
VESTE FARDA**



**COM
SUPREMO
COM TUDO**

**DITADO BOM
JÁ NASCE
VELHO**

**O NORTE
DO MAR
É A LUA**

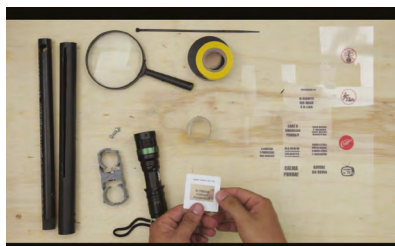
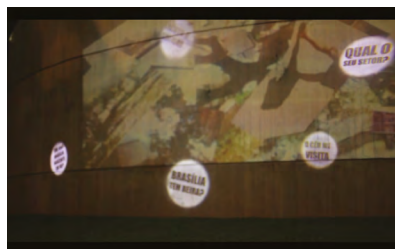
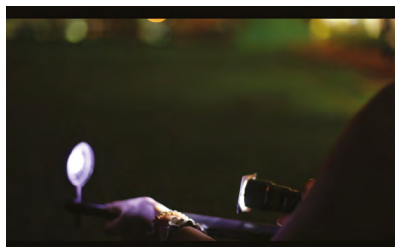
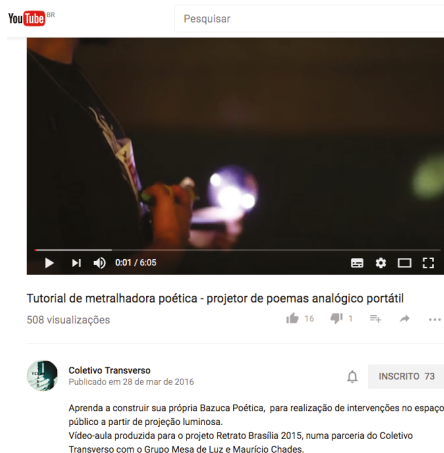
**A SAUDADE
FAZ O QUE
FOI MELHOR
DO QUE ERA**

**SÓ AS
PURPURINAS
SÃO ETERNAS**

You can find tutorials on how to build this and other models of the Poetic Bazooka on Coletivo Transverso's YouTube page:

<https://youtu.be/AX-neDNAnb4>.

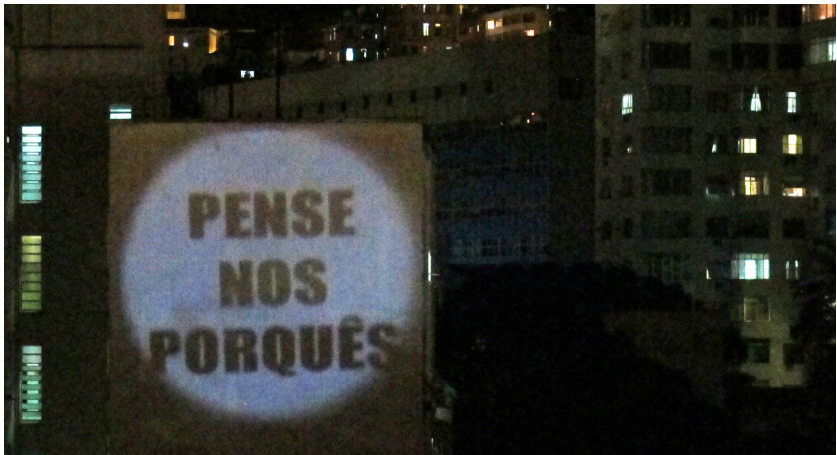
Frames do tutorial disponível no youtube



Frames from the tutorial available at the Coletivo Transverso YouTube page.

Precautions

1. The **Poetic Bazooka** doesn't cause material damage or leave traces, but its shape and handle can be mistaken for that of a gun. If you are black or live in the favela, be accompanied, because even an umbrella and a drill can justify being killed by the PM: "PM confuses umbrella with rifle and kills waiter in Rio" (El País Brasil, 2018)..
2. Don't look directly into the flashlight's light output or point it at other people's eyes. The light is strong and can damage the retina.
3. When not in use, remove the magnifying glass and store it separately to avoid damaging the lens and cable. It is good to have a bag to store the Bazooka, magnifier and slide strips.
4. Check the legislation on transportation. Entering France, I was asked what it was, because of the shape on the x-ray, and I avoided saying that it was a bazooka. I replied: "C'est un projecteur" and managed to take the bazooka in my hand luggage.
5. Whenever possible, take charged spare batteries to prolong the duration of the projections.



Poetic Bazooka projections in São Paulo, 2015. Photo by Cauê Maia.

History

I created the first prototype of the Poetic Bazooka in 2013, based on tutorials on building homemade slide projectors. The first version was not portable, but plugged in. The model, shown in the image below, consisted of a dichroic lamp and three magnifying glasses attached to a disassembled drawer.

The initial purpose was to make it easier to reproduce stencil masks, skipping the steps of diagramming in Illustrator, printing the poem divided into 16 A4 sheets of sulphite paper, and mounting it on 300g triplex paper size A1, before cutting out the contours of the poem.

With the homemade projector, stencil production was faster, cheaper and less wasteful. With an 8cm2 transparency print, I projected the image onto the A1 triplex stuck to the wall with crepe tape, drew the outlines and then cut them out with a stylus. .



Poetic Bazooka first model, 2013. Photo by Cauê Maia.



10th Abre Alas exhibition, Rio de Janeiro, 2014. Photo by Camila Márdila.

The idea of taking the Bazooka to the street came from homemade projection experiments with this first model. One night, while making short videos of projected poems, I saw that the projection reached the neighbor's wall. I realized that this could be an end in itself.

I started researching ways of not depending on the electricity grid. The first conversations in electronics and building materials stores in Rio de Janeiro were curious but productive. I tried to describe what I wanted, but I didn't know what I needed.

When testing it out on the street, I carried an underpowered LED flashlight in one hand, trying to balance the magnifying glass and the slide in the other. In Brasília, I shared the idea with the rest of the Transverso Collective and we went out to the street to carry out new experiments.

At the 10th Abre Alas exhibition, I used a broomstick as a support. The flashlight was fixed to a clamp, while the magnifying glass was loosely held by a clamp to find the focus.

The Poetic Bazooka in this manual can also be used to make stencil masks. Simply attach it to a tripod or support it in a stable place and project the image onto the material on which the mask will be made. Then just draw the projected outlines and cut them out with a stylus..

I tested telescopic mechanisms such as a selfie stick and a window cleaning squeegee, before producing the chassis as it is today. All the development of the Poetic Bazooka since then has been to make it more intuitive. From the broomstick, it was possible to design, but when other people tried, they had trouble finding the focus. The aim is for it to be usable by anyone who picks it up for the first time, even if they don't understand optics.

The Bazooka has been improved and disseminated at exhibitions (10th Abre Alas: Aldeia Gentil Carioca, 2014; Pivô é a rua: Galeria Pivô, 2014, São Paulo/SP, Centro Universitário Maria Antonia, 2019, Atelier Paulista, 2021) and workshops: SESC Paraty, 2016; CCBF Brasília, 2015; Atelier Paulista, 2016; casadalapa-SP, 2017; Sesc Osasco, 2018; Sesc Pinheiros, 2018, Sesc Pompeia 2019.

During Retrato Brasília in 2015, the Mesa de Luz Group, formed by Marta Mencarini and Hieronimus do Vale, brought an improvement to Bazuca: the idea of replacing the individual slides with a strip that enters from one side of the support and exits from the other. The multiplicity of slides brought the Bazooka closer to the cinema, lacking only a regular rotation mechanism.

People often ask if the Bazooka is patented. It is an ongoing research project, financed with public funds, recorded in doctoral theses, exhibitions and publications. But its vocation is replicability. Its exposed optics are used to teach physics. The instrument's didacticism encourages its reproduction.

During a projection event, a child, pointing to the Bazooka, said: "Dad, will you buy me a toy like that?", to which the father replied "That's not the kind of toy we buy, it's the kind of toy we make"

BAZUKAS POÉTICAS

COM COLETIVO TRANSVERSO (DF)

A oficina consiste na criação de intervenções urbanas a partir da utilização de um projetor caseiro desenvolvido pelo Coletivo Transverso (DF). Serão trabalhadas todas as etapas para elaboração da intervenção, da criação poética até a aplicação da mesma em espaço urbano. A oficina estimula o entendimento de Poesia Urbana e incentiva a discussão, apreciação e a pesquisa nas diferentes formas artísticas.

Dias 10, 11 e 12 de agosto, das 17h às 21h.

Vagas limitadas.

As inscrições são gratuitas e podem ser realizadas presencialmente ou através do email: inscricoes.ccsp@sesc.com.br

Maiores informações:

Centro Cultural Sesc Paraty
Rua da Matriz, 20. Centro Histórico. Paraty/RJ
24 3371 4516 / 3371 8415



Workshop flyer Sesc Paraty, 2016



Poetic Bazooka projections in São Paulo, 2022. Photo by Sato do Brasil.

Applications

The **Poetic Bazooka** produces the most ephemeral of interventions: light projection. Once the device is switched off, the poem disappears without leaving any material trace of its existence. Many uses have already been tested and many are still in the pipeline. Its main purpose today is to carry out poetic interventions in public spaces.

The range of the projection depends on 5 factors: (1) the brightness of the environment; (2) the power of the flashlight; (3) the quality of the lens; (4) the texture of the projected surface; (5) the quality of the slide.

In the city, in moderately bright conditions, the Poetic Bazooka projects phrases and drawings at distances of up to 400 meters, with a projected area of up to 10 meters in diameter. The darker the environment, the greater the projection range. On a moonless night on a deserted beach, the range can be many times greater.

The further away from the projected surface, the larger the image and the less sharp and bright it is. The closer the projection, the smaller the image and the greater its sharpness and brightness. A powerful flashlight will therefore provide more distant, larger and sharper projections.

The lens proposed in this manual is a simple school magnifying glass, made of biconvex glass with a diameter of 10 cm and a plastic frame. Other lenses have already been tested on Bazooka, with interesting results. This is the case with 35mm and telephoto lenses from an old analog Pentax, kaleidoscopes and colored filters.

White, smooth surfaces provide greater sharpness and legibility. Materials such as glass and metal reflect light. Textured, irregular and dark surfaces enhance the three-dimensionality of the projection. Translucent fabrics such as voal and tulle allow for layered projection. Trees, sand, moving vehicles, human bodies - each texture produces different results.

High-contrast slides reach greater distances. Well-defined outlines and black printing increase readability. In the case of text, a robust font such as Impact makes it easier to read.

The ephemerality of this technique has a double effect. On the one hand, it cannot be repressed on the grounds of vandalism, and on the other, it increases the importance of timing the action. Without records or witnesses, the projection is less than a whisper.

The absence of material traces allows the Poetic Bazooka to be used in places where it would not be interesting, appropriate or possible to use techniques such as graffiti, paste up or pixação.



Poetic Bazooka projection on Brazilian Presidential Palace 2016. Photo by Janine Moraes.

When there is no time or possibility to print slides, it is possible to write or draw with a fine-tipped permanent marker on some transparent plastic. The possibility of improvisation brings the **Poetic Bazooka** closer to pixinho, since it can respond to urgency in a way that a stencil cannot, because it requires prior production.

Audiovisual is a powerful interface for the Poetic Bazooka. A photography and video team with an action plan can guarantee a quality record. If such team is not available, the projection will have to take longer, so that other people have time to read and record. It's common to underestimate the reading time of those who weren't expecting the intervention.



Poetic Bazooka projections in an anti-fascist demonstration São Paulo, 2021.

Photo by Cauê Maia.



Poetic Bazooka projection over police vehicle, Fiesp, 2016. Photo by Cauê Maia



Poetic Bazooka projection, São Paulo, 2019. Photo by Maíra Bühler.



Poetic Bazooka projection with handmade slide , 2018, Photo by Sato do Brasil.

Unexpected public intervention takes time to process. People see the light, reads it, looks around, wonders where it's coming from. Only then do they pull out their cell phone or camera to record it.

Agglomerations increase the reach: concerts, demonstrations, commemorative dates, carnivals, etc. Projecting at an event with live transmission is a way of hacking other means of communication. In this case, it is important to identify the framing of the cameras and know the right time to project, especially if the content of the projection is controversial.

In 2016, we carried out an action with two **Bazookas** at the closing table of the Paraty International Literary Festival (Flip). Folha de S.Paulo published a photo of the action, demonstrating its potential to influence the political agenda of media outlets.

Actions like this show the inter-media nature of Bazuca. The projection serves as a caption for the photo and offers a counter-narrative to the discourse in the media. With the experience of projections in the street, the eye gets used to identifying surfaces with better potential, places of prominence and greater visibility.

The sequence of sentences generates a narrative. The combination of two or more projections works like stanzas in a poem or like different voices in dialog: a question and answer game or a continuity. The relationship between the projections depends on form, content and composition..



Poetic Bazooka projection in São Paulo, 2022. Photo by Cauê Maia.

Última mesa da Flip termina com ato contra Temer

Keiny Andrade/Folhapress



Coletivo projeta mensagens contra o presidente interino Michel Temer na última mesa da Flip

LUIZA FRANCO
ENVIADA ESPECIAL A PARATY (RJ)

03/07/2016 16h43 - Atualizado às 21h08

A última mesa da Flip (Festa Literária Internacional de Paraty), onde os autores convidados leem trechos de seus livros favoritos, acabou com uma intervenção contra o presidente interino, Michel Temer.

Ao final, enquanto os autores desciam do palco e após os agradecimentos do curador, Paulo Werneck, foram projetadas no telão da tenda as frases "Temer jamais" e "Não pise na democracia". A manifestação foi feita pelo coletivo de intervenções urbanas Transverso.

Durou poucos segundos. Não houve reação por parte de Werneck nem dos autores, que pareciam não tê-la notado.

Consider taking your time on each surface, to allow time for reading and any spontaneous recording. Another strategy is to wait until everyone has their cell phones ready to start the projection. The artist's entrance on stage, the farewell, the climax of a speech, the most anticipated song. It's important to be familiar with the event's ceremonies. Projecting too early reduces the impact of the speech.

In the case of live broadcasts from adverse broadcasters, there may only be a window of opportunity to deliver the speech. It's important to wait for the right moment and ensure that the projection is within the camera's frame.

Poetic Bazookas have already been used as a scenic and narrative element in the plays {ENTRE} by Coletivo Negro, which premiered in 2014, and Pretoperitamar: o caminho que vai dar aqui, among others. The actors projected phrases they had created. The rifle-like grip was related to the theme of the play



Poetic Bazooka on stage in the theatrical play {ENTRE}, Coletivo Negro, 2014



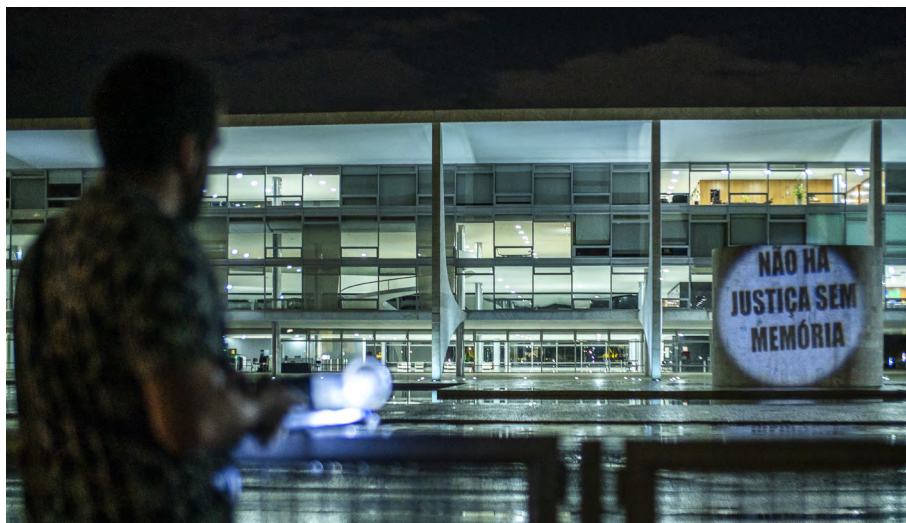
Poetic Bazooka projection at Plaza de Mayo, Buenos Aires 2022. Maira Bühler.

The **Poetic Bazooka** provides an interesting accompaniment for fanfares and other musical parades. The relationship with music reinforces the issue of timing. Projection is an art of timing. The phrases offer counterpoints of emphasis or irony to the lyrics.

Attached to a tripod, the Bazuca works like a traditional slide projector or overhead projector. In this way, it helps to transpose images printed in transparency onto surfaces such as walls or stencil masks.

The **Bazooka**'s independence from a power source allows it to be used as an analog powerpoint in presentations of teaching material where there is no electricity, provided the batteries are charged beforehand.

The slides are placed upside down, from right to left. This is because the rays of light cross each other as they pass through the lens, projecting an inverted image. This model of the **Bazooka** has its mechanism exposed, serving to demonstrate the principles of physics in an intuitive way.



Poetic Bazooka projection, Brazillian Presidential Palace, 2023. Photo: Bruno Bernardes.



Projection with Poetic Bazooka, São Paulo, 2022. Photo by Sato do Brasil.