

# Camera stabilisation with crutches

<b>Start Date</b>	01 Dec 2017
<b>Initiated Activity</b>	TOM:Melbourne Makeathon 2017
<b>Challenge</b>	Camera stabilisation with crutches
<b>Photo</b>	
<b>Stage</b>	<b>PROTOTYPE</b>
<b>Type</b>	<b>ACCELERATOR</b> <b>WORKSHOP</b> <b>EVALUATE</b>

## About the project

	English Details	Local Language Details
<b>Need Knower Background</b>	Our need knower is Amy Marks a 21-year-old media student with cerebral palsy and this is her first involvement with the TOM makeathon. Amy uses crutches to mobilise, which affects her balance and gross motor skills.	
<b>Challenge</b>	As a media student, Amy wants to be able to film documentaries and short films independently carrying a hand-held camera, which she currently finds difficult. Our challenge is to produce a device that will assist Amy film whilst on crutches as independently and as stable as possible.	
<b>Solution</b>	Our device started off as a simple camera stabilisation vest that is worn over the shoulders and strapped around the waist with a buckle. In order to tailor the vest towards Amy's needs, we created a 3 arm stabilisation system using 3D printed parts and Loc-line. To increase comfort and usability we added padding and replaced the buckle strapping with velcro straps for easier use with Amy's fine motor skills.	
<b>Team</b>	Duncan, Dennis, Tom, Neoh, Gautam, Justin, Cindy, Kathy, Teri, Jaime, Jaime, Jin and Amy Marks.	

Approximate Time to Build	Approximate Cost to Build
	Vest = \$300
	Loc-line = \$50
	Hand held monopod = \$20
	Other products = \$50

### General Warnings and Cautions

- Read through entire manual before attempting to build this device.
- Do not attempt a step if you are unsure of what you are doing. Certain steps in this manual require experience with fabrication tools. Incorrect implementation can lead to injury of yourself and others. For assistance or clarification of any step, contact team members.

## Meet the Team

### Makers:

Duncan d.glascodine@gmail.com	Dennis	Tom	Neoh
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Cindy cindienguyen96@gmail.com	Kathy kathynguyen95@gmail.com	Teri	Jaime
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**Need Kowner:**

Amy Marks
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**Documentation Contributors:**

Cindy Nguyen ,Maya Bell

▼ [Icon Glossary](#)

The following icons may be used throughout this manual—each with its own purpose.

The warning icon is used to signify whenever someone who is attempting the procedure may injure themselves or damage the equipment.

The info icon is used to signify useful bits of information that complement the instructions.

The tip icon is used to provide information for after the procedure is completed, such as tips for disassembly.

▼ [Device's Timeline](#)

History of Device

**Project Start Date:** 25/10/17

**Project End Date:** 3/12/17

**Origin of Project:** TOM Makeathon Melbourne 2017

Potential Improvements

Cycle #	Cycle Start Date	Cycle End Date	Suggested Modifications	Need Kowner Feedback
1				
2				
3				

▼ [Physical Description](#)

Brief Physical Description

Camera vest with shoulder and waist straps

Quick release camera mount

Z form stabiliser



						Total:	

▼ Compiled Resources and References

▼ Tools and Machines Required

## Tools and Machines Required

Name of Tool/Machine
Makerbot (3D printer)
Swinburne Nylon 3D printer
Sewing machine

▼ Supplementary Files

### Supplementary Files

▼ CAD Files

▼ Code Files

▼ Diagrams

▼ Video Demonstrations

▼ Software and Programming Online Resources

### Software and Programming Online Resources

▼ APIs

▼ Libraries

▼ Other Reference Material

▼ Build Instructions

▼ Subassembly #

Subassembly 1: Camera vest with padded shoulders and waist strap



▼ Step #

### Instructional Step 1 / 3

#### Tools and Machines Required for this Step

Name of Tool/Machine

#### Materials and Parts Required for this Step

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Name of Material/Part	Quantity
Camera vest	1

### Supplementary Files Used for Subassembly



### Instructions

- Apply vest to Need Knower and customise foam padding to her shoulders, ensuring snug fit and comfort.
- Cut foam padding as required with Stanley knife and adhere with double sided tape.

▼ Step #

### Instructional Step 2 / 3

**GAUTAM AND NEOH TO WRITE**

#### Tools and Machines Required for this Step

Name of Tool/Machine
3D printer

#### Materials and Parts Required for this Step

Name of Material/Part	Quantity

## Supplementary Files Used for Subassembly



### Instructions

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### ▼ Step #

#### Instructional Step 3 / 3

#### Tools and Machines Required for this Step

Name of Tool/Machine
Sewing kit/machine
Lighter
Scissors

#### Materials and Parts Required for this Step

Name of Material/Part	Quantity
Belt components from shoulder straps purchased with vest	2
Hook and loop fastener	50cm
Metal buckle	1

### Supplementary Files Used for Subassembly



INSERT PHOTO



### Instructions

- Slide pelvic belt strap webbing through shoulder padding straps of vest (provides naturally curved surface for Amy to wrap around body)
- Measure against Need Knower's waist, and cut length according to size
- Apply hook and loop fastener as appropriate
- Attach buckle at the end of webbing strap for ease of looping into belt with sewing machine or hand sewing

We used the shoulder padding from the vest that was purchased for curved surface belt.

✓ Subassembly #

Subassembly 2: Z axis stabiliser



▼ Step #

**Instructional Step /**

**Tools and Machines Required for this Step**

Name of Tool/Machine

**Materials and Parts Required for this Step**

Name of Material/Part	Quantity

**Supplementary Files Used for Subassembly**



**Instructions**

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Step #

**Instructional Step /**

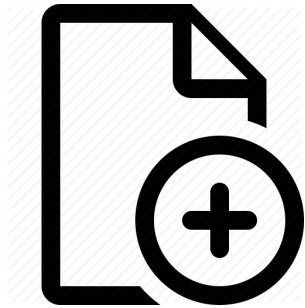
**Tools and Machines Required for this Step**

Name of Tool/Machine

**Materials and Parts Required for this Step**

Name of Material/Part	Quantity

**Supplementary Files Used for Subassembly**



**Instructions**

.

Subassembly #

Subassembly 3: Quick release camera mount



Step #

Instructional Step /

Tools and Machines Required for this Step

Name of Tool/Machine

Materials and Parts Required for this Step

Name of Material/Part	Quantity

Supplementary Files Used for Subassembly





### Instructions

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▼ Step #

### Instructional Step /

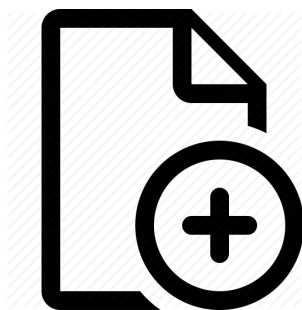
#### Tools and Machines Required for this Step

Name of Tool/Machine

#### Materials and Parts Required for this Step

Name of Material/Part	Quantity

#### Supplementary Files Used for Subassembly





### Instructions

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Subassembly #

Subassembly 4: Detachable crutch film trigger



Step #

#### Instructional Step 1 /

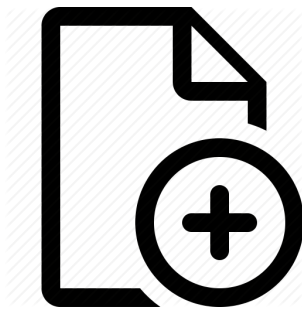
#### Tools and Machines Required for this Step

Name of Tool/Machine
3D printer

#### Materials and Parts Required for this Step

Name of Material/Part	Quantity
CAD files for trigger housing	L and R side

## Supplementary Files Used for Subassembly



### Instructions

- 3D print CAD files for trigger housing

▼ Step #

### Instructional Step 2 /

#### Tools and Machines Required for this Step

Name of Tool/Machine
Laser cutter

#### Materials and Parts Required for this Step

Name of Material/Part	Quantity
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Acrylic 10mm and 3mm	1 of each
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### Supplementary Files Used for Subassembly



### Instructions

- Laser cut trigger out of 10mm acrylic and the housing attachments out of the 3mm acrylic.

▼ Step #

### Instructional Step 3 /

#### Tools and Machines Required for this Step

Name of Tool/Machine
Bench press
3mm drill
M3 tap

### Materials and Parts Required for this Step

Name of Material/Part	Quantity
Acrylic trigger	1

### Supplementary Files Used for Subassembly



### Instructions

- Drill hole in base of trigger for button screw
- Tap hole with M3 tap

▼ Step #

**Instructional Step 4 /**

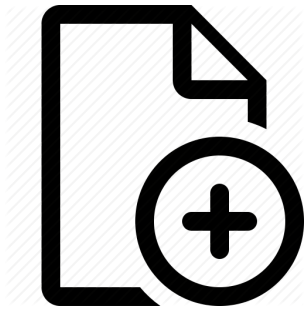
**Tools and Machines Required for this Step**

Name of Tool/Machine

**Materials and Parts Required for this Step**

Name of Material/Part	Quantity
Hook and fastener strip	1 of each
Epoxy resin (Aeryldite)	
Trigger acrylic	
Iron square	1
Magnet	1

**Supplementary Files Used for Subassembly**



**Instructions**

- Glue velcro to side of trigger housing (left case)
- Glue iron square to trigger
- Glue magnet to recess in left case



▼ Step #

### Instructional Step 5 /

#### Tools and Machines Required for this Step

Name of Tool/Machine
Sewing machine or kit

#### Materials and Parts Required for this Step

Name of Material/Part	Quantity
Webbing	
Hook and look fastener	

#### Supplementary Files Used for Subassembly



#### Instructions

- Sew webbing for attachment to crutch, measuring the amount of webbing that is required to fit around the crutch
- Apply vertical strip of hook fastener onto webbing
- Apply vertical strip of loop fastener onto trigger case
- Glue strapping onto right case

▼ Step #

### Instructional Step 6 /

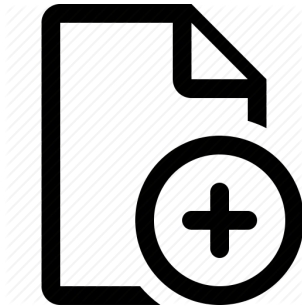
#### Tools and Machines Required for this Step

Name of Tool/Machine
Transmitter and receiver
Phillips Head screwdriver

#### Materials and Parts Required for this Step

Name of Material/Part	Quantity
Trigger	
Housing (left and right case)	

#### Supplementary Files Used for Subassembly



## Instructions

- Disassemble remote controller and reassemble without trigger button and mode selection slider
- Assemble everything:
  - Right case bottom first with M3 bolt through bottom hole
  - Slide in remote controller
  - Housing attachment
  - Eye of trigger onto M3 bolt
  - Left case at the top
  - Fasten M3 nut onto bolt
  - Fasten last M3 bolt and nut through top hole of housing