

# Noah: Security Infiltration Drone

## Innovation Works Co., Ltd.

Tiger Sun (VP, Software Engineering)

Dinuka Ranasinghe (VP, Mechanical Engineering)

Qilei Cai (VP, Project Testing and Marketing)

December 7, 2017

EG1003 A2

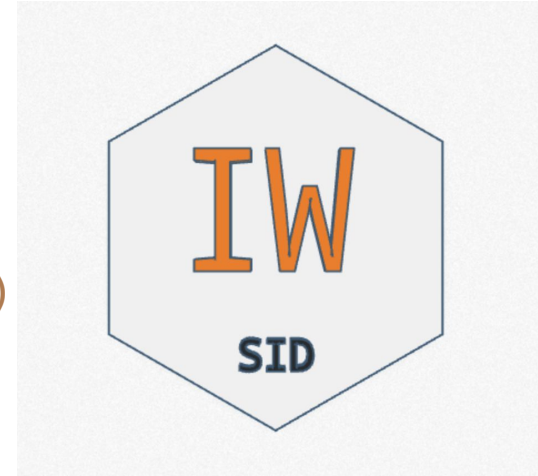


Figure 1: Company Logo

# Agenda

- Company Profile
- Project Description
- Cost Estimate
- Project Schedule
- Advantages of Product
- Conclusion

# Company Profile

## **Innovation Works Co., Ltd.**

- Founded in 2004
- Specializing in robots for home, office & government agencies
- To design robots that make people work easily and live better
- Previous clients include: *Accenture, Internal Revenue Service (IRS), U.S. Department of Homeland Security, Ministry of Defense, U.S. Department of Education*

# Company Profile

## Our Expertise

- R&D centers in LA & Shanghai
- Engineers with average experience of 5 years

## Our Reviews

- PC Magazine: “Best product stability for this price range.”
- WIRED Magazine: “Noah’s (SID) speed on the course is impressive.”

## Our Promise

- On-time delivery or half of your money back
- 5-year warranty
- Free maintenance under warranty
- Discounted maintenance if warranty expired



Figure 14: Industry Acclaim

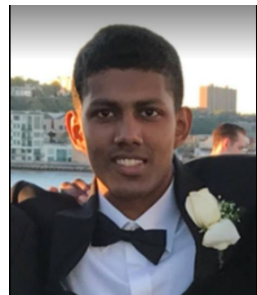
# Company Profile



**Qilei Cai**

VP, Project Testing and Marketing

- Graduate of NYU Tandon
- MBA, NYU Stern
- BS in Computer Science



**Dinuka Ranasinghe**

VP, Mechanical Engineering

- Graduate of NYU Tandon
- MS in Mechanical Engineering
- BS in Civil Engineering



**Tiger Sun**

VP, Software Engineering

- Graduate of NYU Tandon
- MS in Computer Science
- BS in Computer Engineering

# Project Description

- Client: [Central Intelligence Agency](#) (CIA)
- Requesting a robot to infiltrate building, retrieve data, and exit
- Specific requirements
  - Move over a route, scan barcodes to open gates, get data canister
  - Deliver canister to point, go to exit



Figure 2: Seal of the CIA

# Project Description

- The sequence of barcodes that was engineered for the robot to scan: A-C-D-B-C
- Each barcode scanned opened a different gate(s)

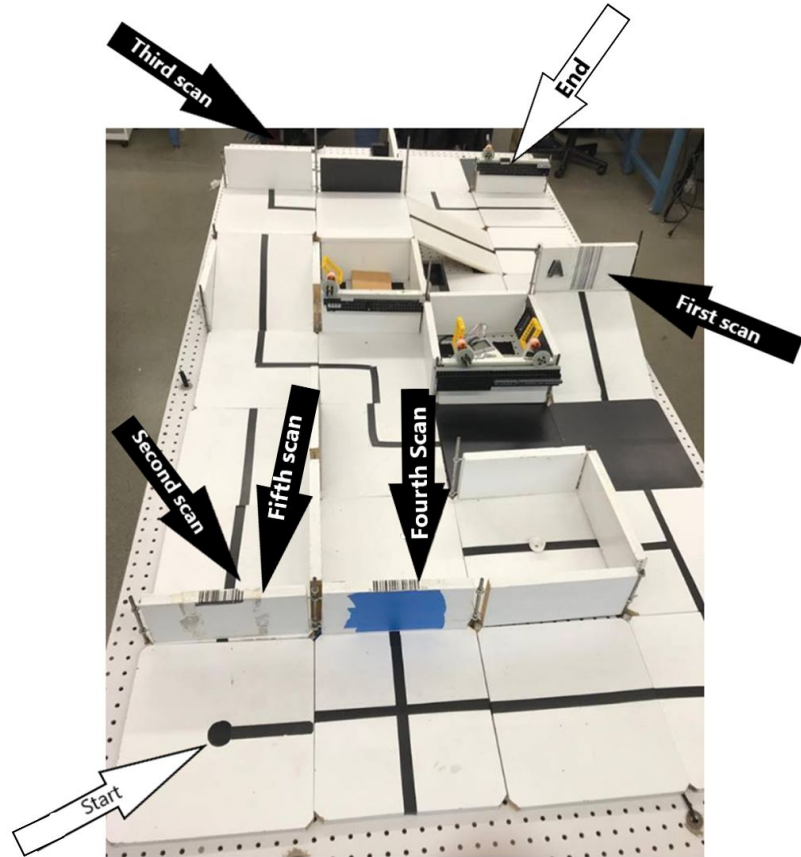
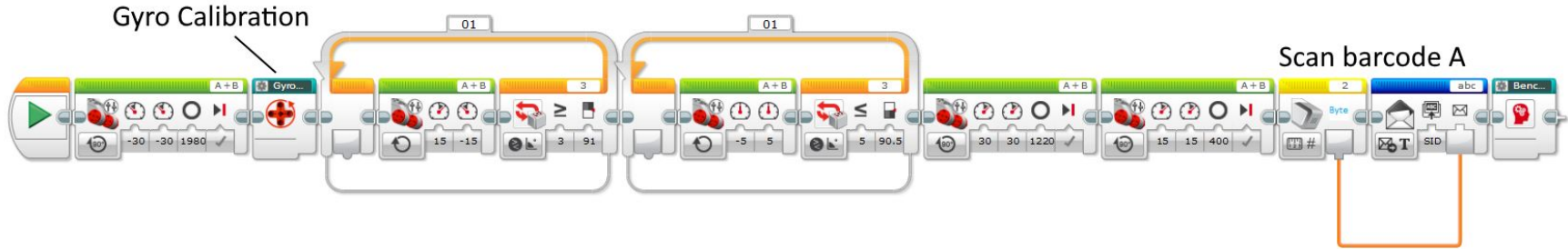


Figure 3: Sequence of barcode scans A-C-D-B-C

# Project Description

- Robot powered by new generation motor
  - 2x speed as compared to previous generation
- Engineered precision in moving in programmed routes
  - Does not veer off track



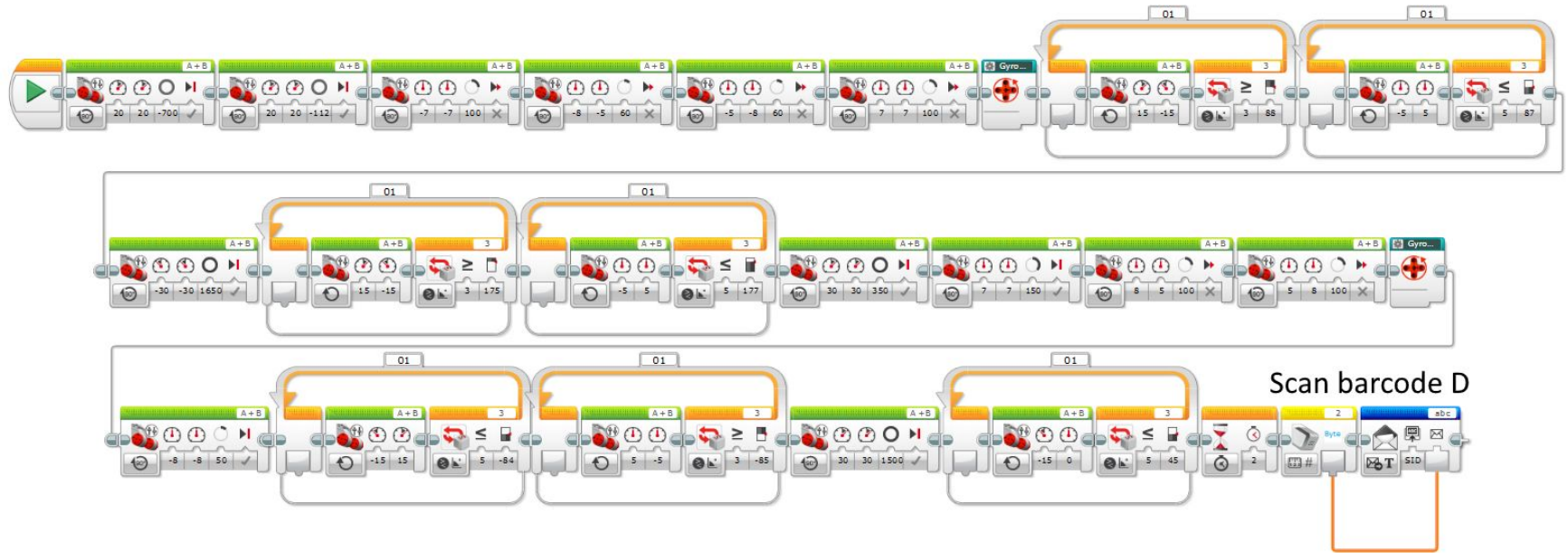


# Project Description



- Scanning of barcode C primarily hard coded
- Gyro calibration utilized throughout to obtain precise turns and movements

# Project Description

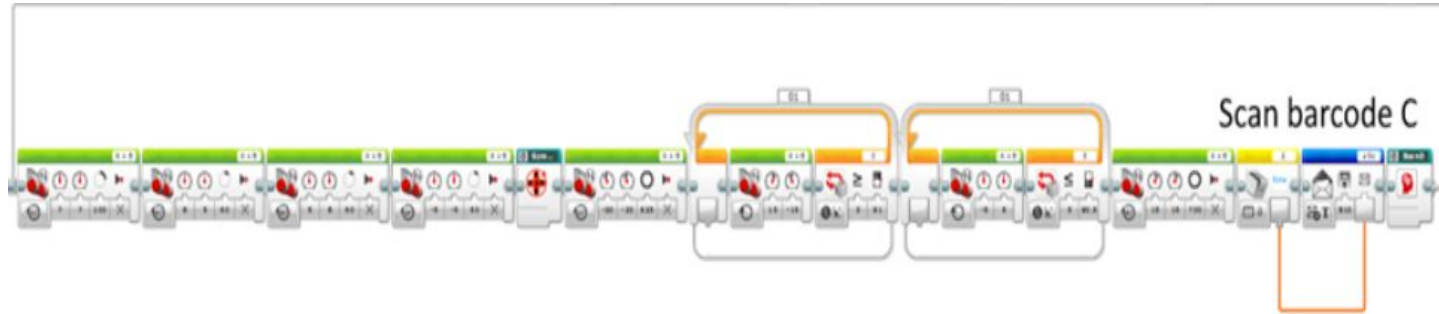


- Scanning of barcode D primarily hard coded
- Gyro calibration utilized throughout to obtain precise turns and movements
- Longest code because robot is required to traverse over a hill and obstacles



- Scanning of barcode B again using primarily hard code
- Code is long because robot is returning from Barcode D, which is on the other side of the course
- Gyro calibration utilized here again to ensure preciseness of turns

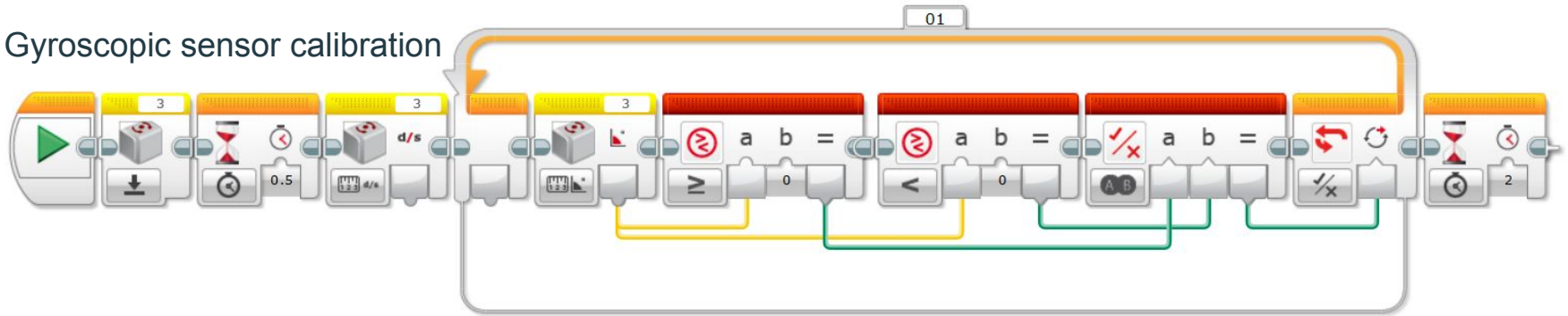
# Project Description



- Scanning of barcode C again using primarily hard code
- Gyro calibration utilized here again to ensure preciseness of turns

# Project Description

Gyroscopic sensor calibration



- Resets gyro sensor
- Waits for gyro sensor to equalize drift by using for loop

# Project Description

Top View

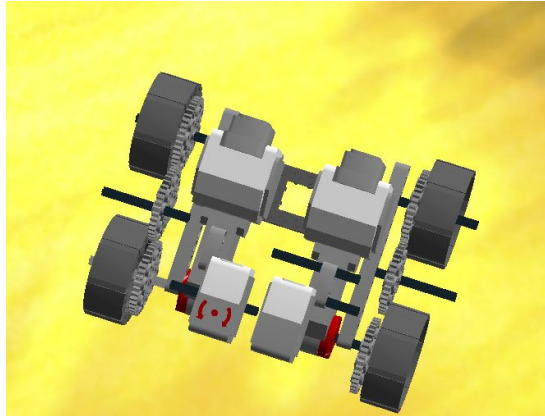


Figure 6: Top view

Front View

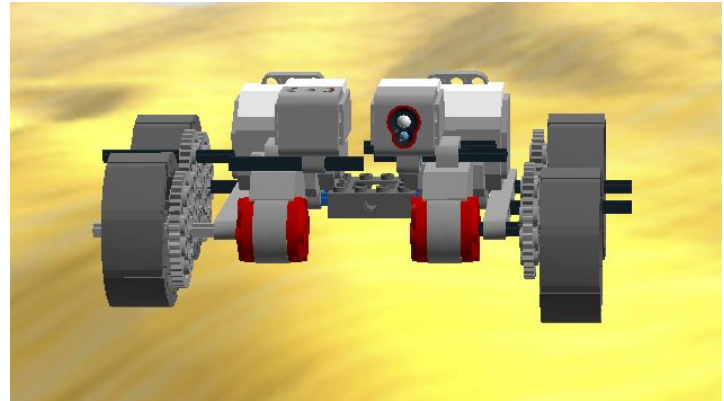


Figure 7: Front view

# Project Description

Isometric View

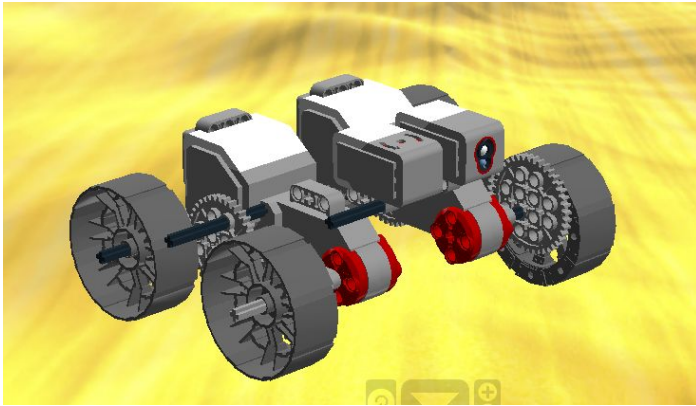


Figure 8: Isometric view

Most Detailed Side View

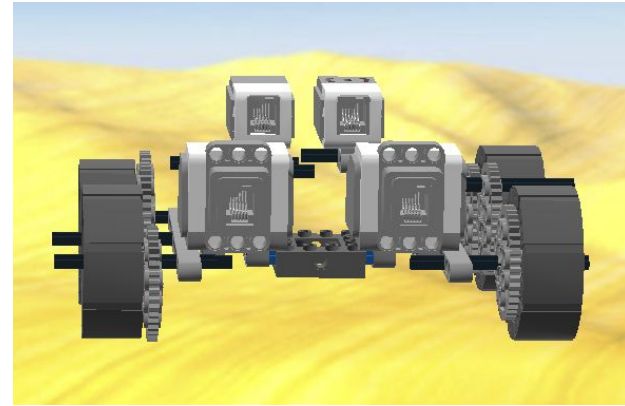


Figure 9: Most detailed side view



# Project Description

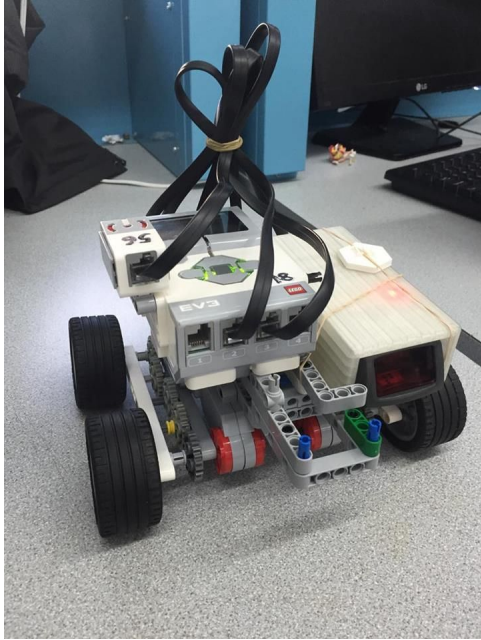


Figure 10: Isometric view of robot

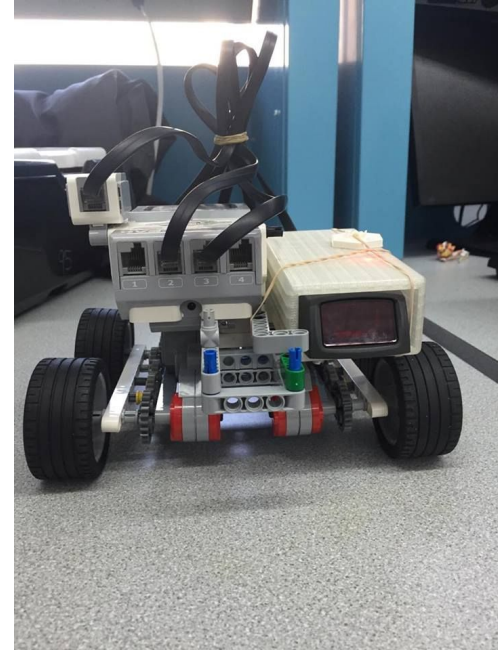


Figure 11: Front view of robot

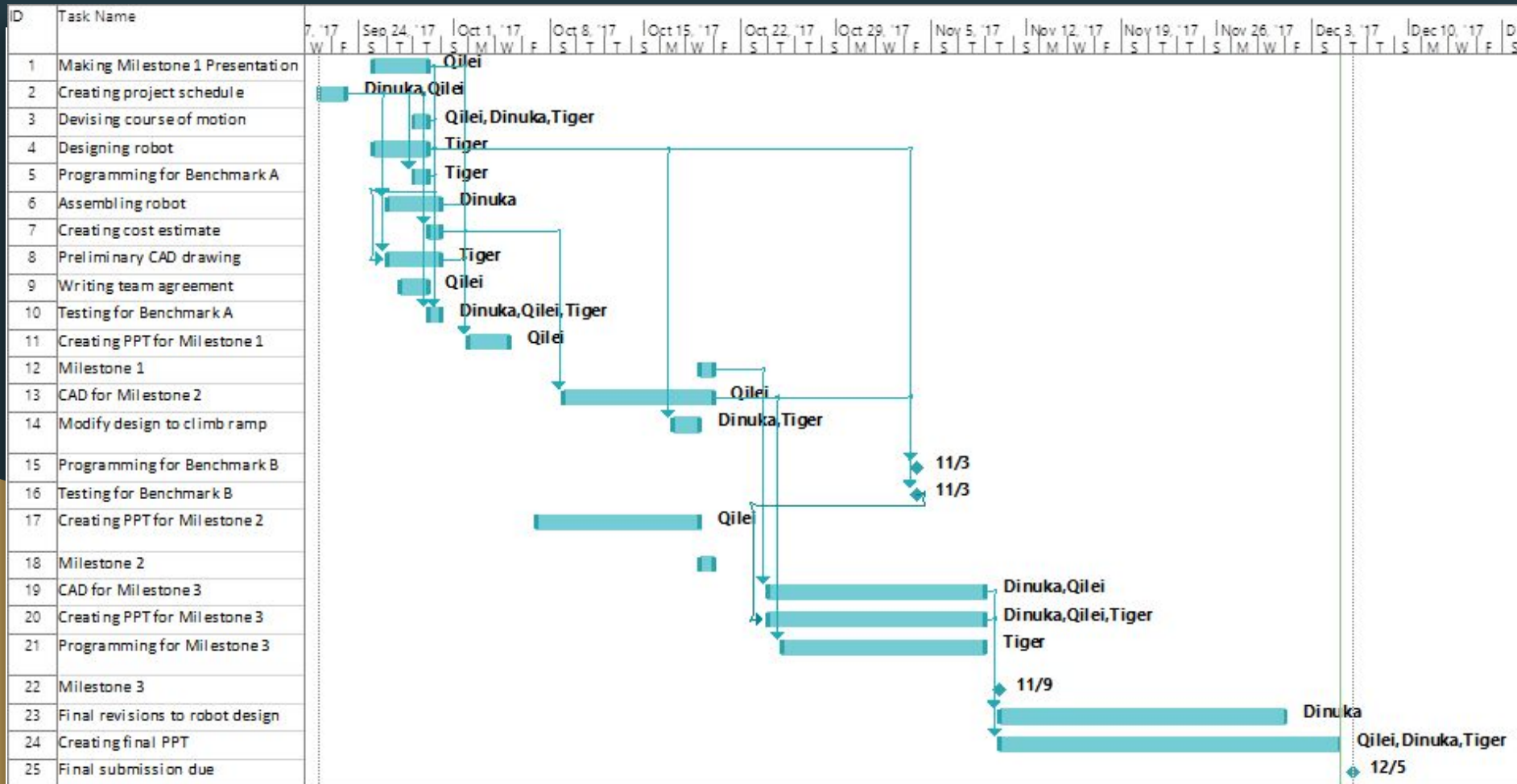


# Video Demo

# Cost Estimate

**Table 1: Cost estimate**

No.	Part No.	Item	Quantity	Unit Cost (USD)	Unit Total (USD)
1	1337	Barcode scanner	1	350	350
2	45505	Electric, Sensor, Gyro – EV3	1	350	350
3	45503	Electric, EV3 Medium Servo Motor	2	150	300
4	45502	Electric, Motor EV3	2	218.2	436.4
5		Miscellaneous			98
		<b>Hardware Total</b>			<b>1535</b>
6		Labor	25	50	1250
		<b>Grand Total</b>			<b>2785</b>



# Advantages

1

**Delivered on time to CIA**

Completed within short time  
for urgent task

2

**Successfully completed mission**

Infiltrated CIA headquarters  
and retrieved data

3

**Cheaper than competitors**

Higher productivity = fewer  
labor hours



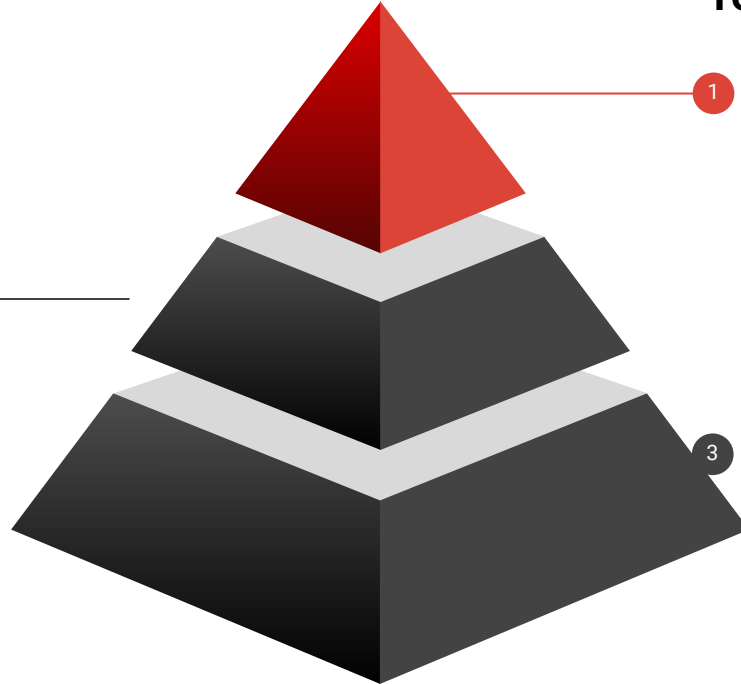
Figure 13: CIA Headquarters

# Conclusion

## **We are EFFICIENT**

Delivering products within the least time among competitors

2



## **You are GUARANTEED**

5-year warranty +  
discounted maintenance  
afterwards

1

## **We are EXPERIENCED**

Specializing in  
robotics for 13 years

3

# Bibliography

- “Ambalika Institute - Best Engineering Colleges in Lucknow.” *Ambalika Institute of Management & Technology*, [aimt.edu.in/wp-content/uploads/2016/04/robots.jpg](http://aimt.edu.in/wp-content/uploads/2016/04/robots.jpg).
- “File:Seal of the Central Intelligence Agency.Svg.” *Wikipedia*, Wikimedia Foundation, [en.wikipedia.org/wiki/File:Seal\\_of\\_the\\_Central\\_Intelligence\\_Agency.svg](http://en.wikipedia.org/wiki/File:Seal_of_the_Central_Intelligence_Agency.svg).
- NYU Tandon School of Engineering. 2016. “Security Infiltration Drone.” EG 1003 Online Lab Manual. Accessed November 26, 2017 from [egmanual.poly.edu](http://egmanual.poly.edu).
- “SOTI MobiControl: PC Magazine Editors' Choice 2016.” *SOTI*, <http://www.soti.net/resources/reports/soti-mobicontrol-pc-magazine-editors-choice-2016/>
- “The Special Operations Forces Situation Report.” *SOFREP*, [sofrep.com/wp-content/uploads/2016/06/140311-cia-hq-004\\_104b0b8a120b62af542a8728164460d7.jpg](http://sofrep.com/wp-content/uploads/2016/06/140311-cia-hq-004_104b0b8a120b62af542a8728164460d7.jpg).
- “WIRED.” *WIRED*, WIRED Magazine, <https://www.wired.com/>.

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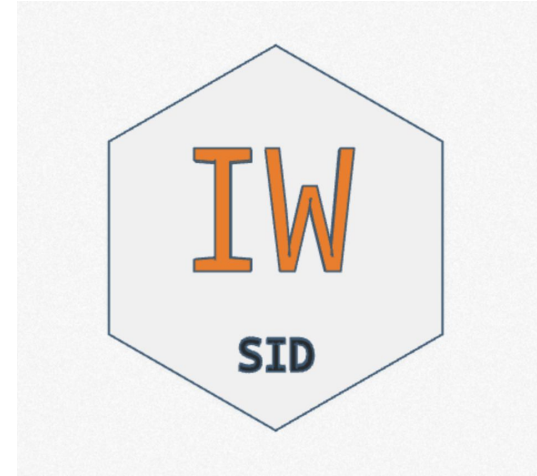


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