RCTB – ERROR DETECTION OF HIT

Presented by:-

Deepak Jayanth	10305913 (Leader)
Pratik Patodi	10305917
Firuza Aibara	P11119
Alluri Srinivas	10305076

OBJECTIVE

- To develop a prototype for a real world existing problem for The Indian Navy.
- To detect the accuracy of a missile hit on a target (or enemy) boat/ship.

REQUIREMENT SPECIFICATION

- Hardware
  - Two Firebird bots
  - Four Zig-bee module for communication
  - Two wired Camera & one wireless camera

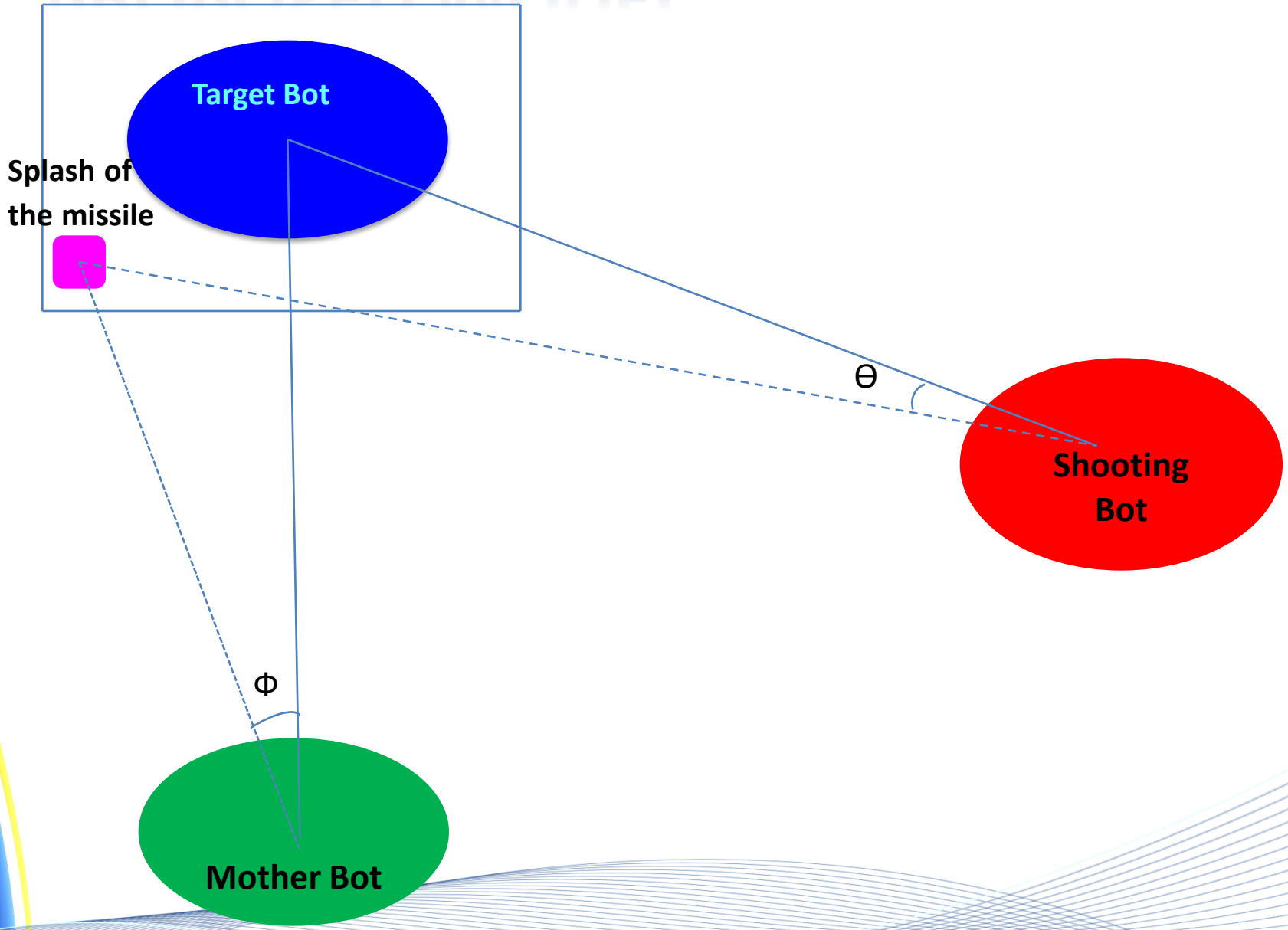
- Software
  - AVR Studio4
  - Scilab
  - Esterel

HARDWARE AND SOFTWARE REQUIREMENT OF ACTUAL IMPLEMENTATION

- Hardware
  - Two Spark V bot
  - Three Zig-bee module for communication
  - Three wired Camera

- Software
  - AVR Studio4
  - Scilab

PROPOSED MODEL

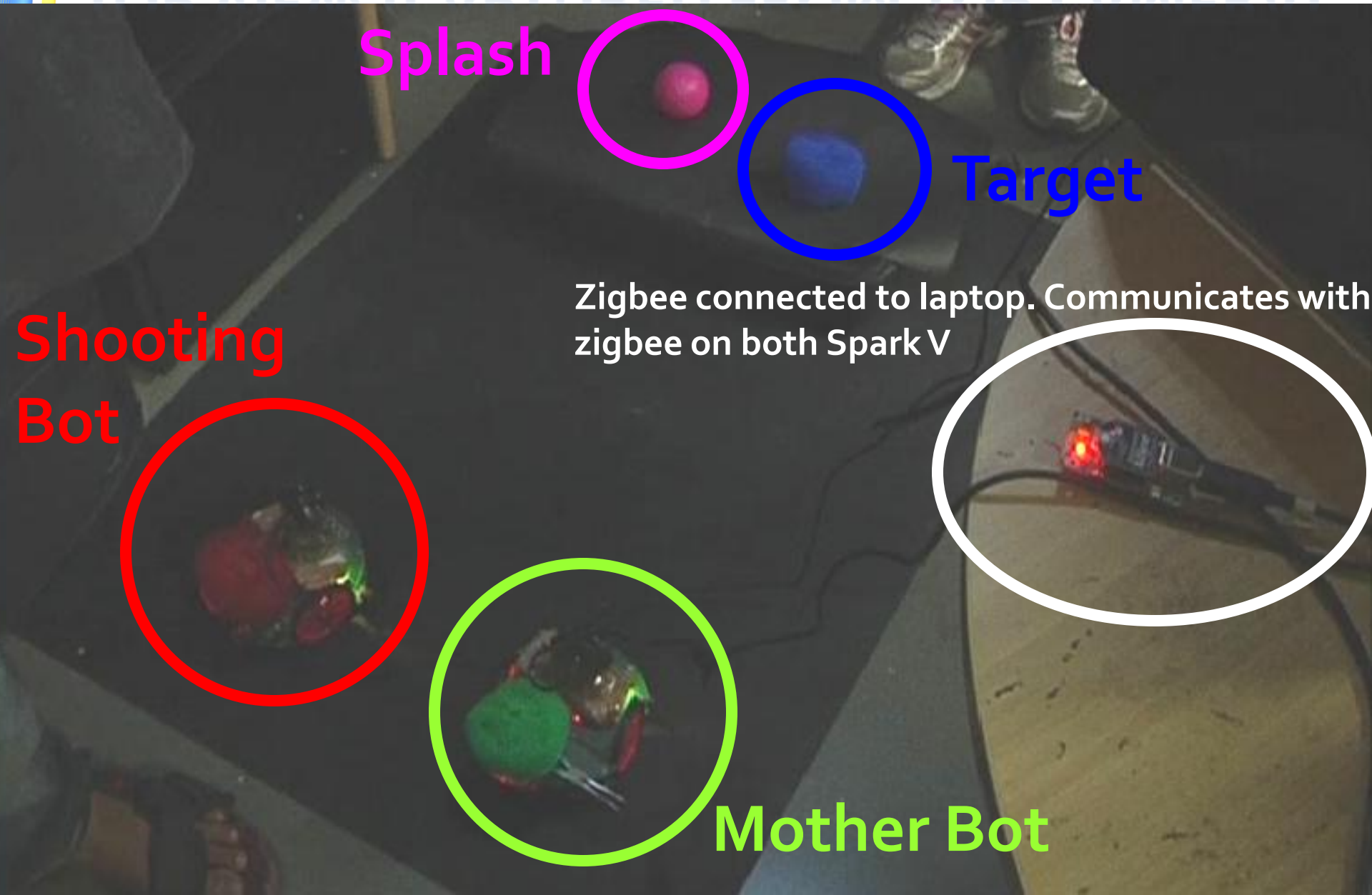


COMPARISON WITH ACTUAL IMPLEMENTATION

Module	Implemented Project	Real World
Distance Measurement	Overhead camera	RADAR
Sensing the target	On board camera	Binocular
Missile hit location	By sensing color of ball/object	Water Splash
Output	From PC	-
Verification	Overhead Camera	-

SCREENSHOTS

TOP VIEW (CAPTURED FROM TOP CAMERA)

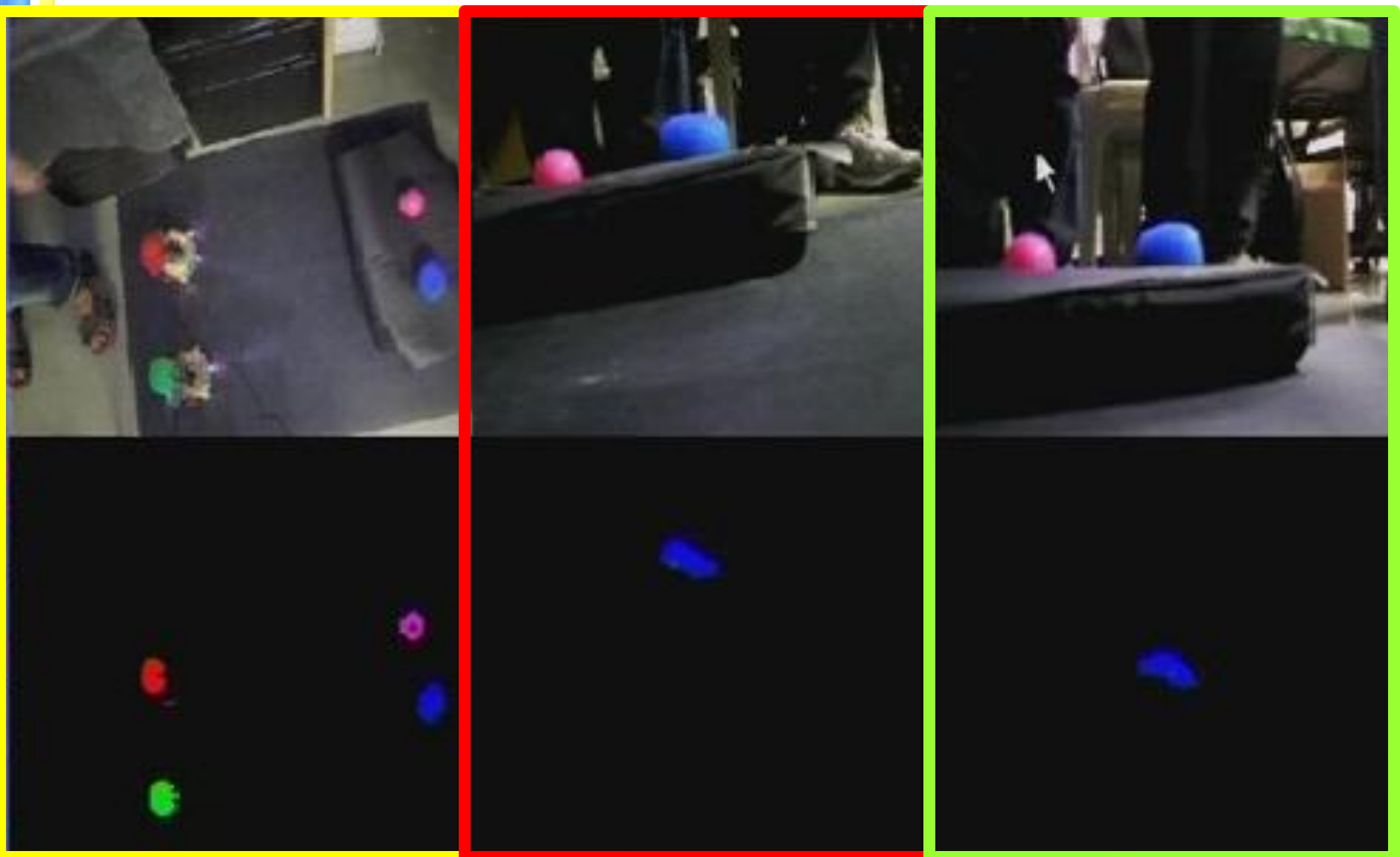


PERFORMING IMAGE PROCESSING

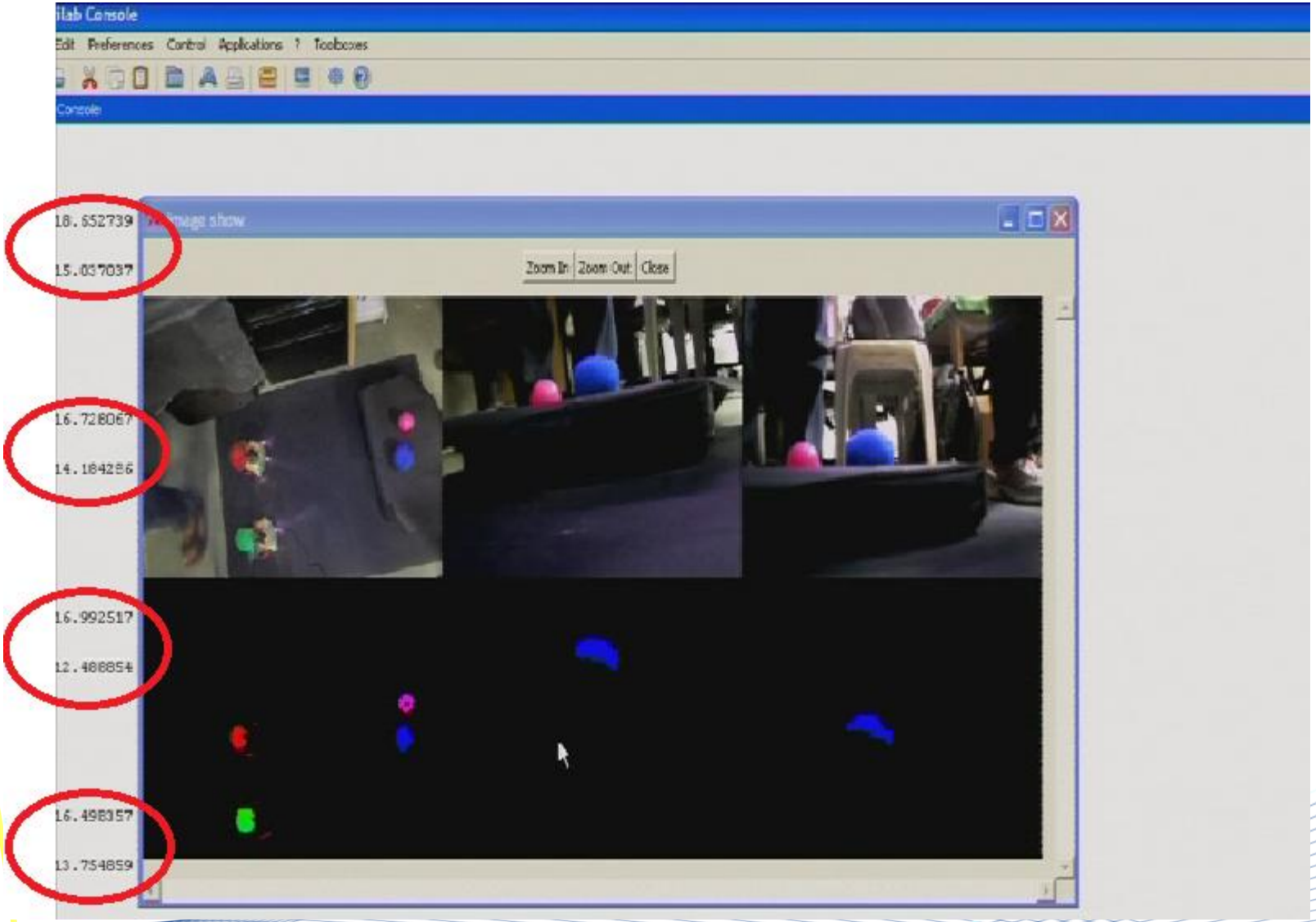
Top view

Shooting Bot

Mother Bot



RESULT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Console
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15.037037
Zoom In
Zoom Out
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13.754859

CHALLENGES FACED

- Performing Image Processing using 3 camera's simultaneously.
- Connecting and working with 1 Zigbee to communicate with the other two on different bots through broadcast.
- Calibrating the camera to detect distance accurately.
- Calculating the Angle between the target and the landing position of missile (splash).
- Implementing image processing and serial communication through Scilab.

TEST CASES

S.No	Case	Result
1	Bots are already aligned	Passed
2	Target is visible, but not at center	Passed
3	Target is not visible	Failed sometimes
4	Target is moving	Passed
5	Splash at various locations	Passed
6	Splash occults target	Failed

PROJECT SCOPE

- Reusable code
  - Object detection
  - Real-time monitoring
  - Distance measurement

FUTURE SCOPE

- Modeling splash dynamically by a projectile(by means of object thrower) .
- To mount the target object on a bot instead and do the same algorithm for fast moving bot.

THANK YOU