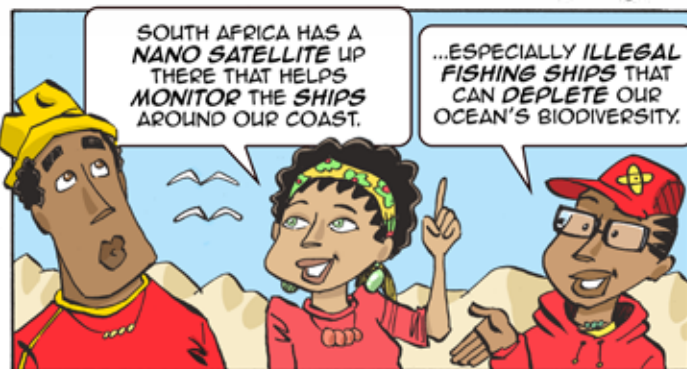
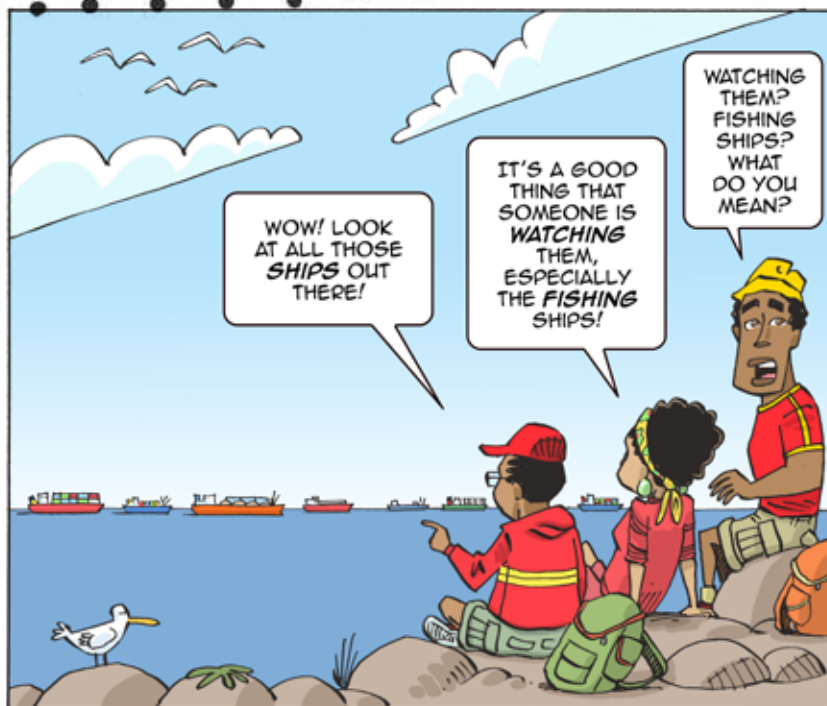




AN EYE IN THE SKY!



SMALL ... BUT POWERFUL

"NANO" MEANS SMALL. SO A NANOSATELLITE IS A SMALL SATELLITE - BUT THAT DOES NOT MEAN IT CAN'T DO AMAZING THINGS.

ZACube2 is a South African nanosatellite that is used to monitor ships in South African seas. It also checks for veld fires so that they can be controlled in time.

HOW ABOUT THIS... ZACUBE2 IS THE SECOND OF SOUTH AFRICA'S NANOSATELLITES IN SPACE.



FOUND YOU!!

THIS GAME IS CALLED "FINDING SHIPS". IT IS PLAYED IN PAIRS.

YOU WILL NEED:

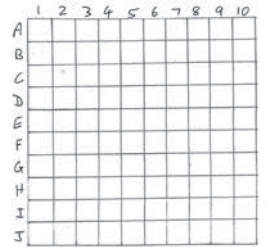
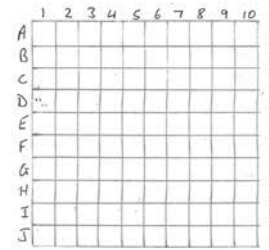
- TWO PIECES OF A4 PAPER
- PENS/PENCILS



MAKING THE GAME

- 1 EACH PLAYER MUST DRAW **TWO GRIDS** ON THEIR SHEET OF PAPER, AS SHOWN IN THE PICTURE.

THE TOP GRID IS FOR YOU TO 'HIDE' YOUR SHIPS. EACH OF YOU MUST DRAW 5 'SHIPS' ANYWHERE ON YOUR GRID BY COLOURING IN SOME OF THE BLOCKS (SEE BELOW). THE SHIPS MUST ALL BE **DIFFERENT SIZES** - 1, 2, 3, 4 OR 5 BLOCKS EACH. ONLY DRAW THEM GOING UP OR ACROSS, NOT DIAGONALLY.

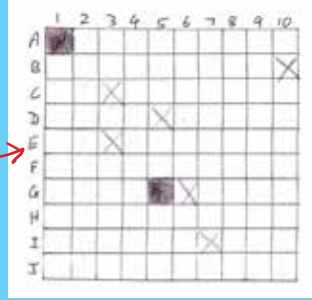
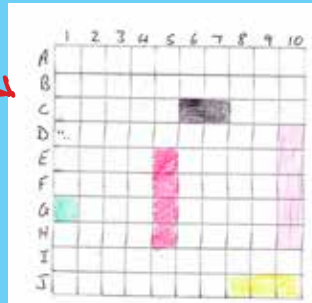


PLAYING THE GAME

- 2 WITHOUT BEING ABLE TO SEE YOUR OPPONENT'S PAPER, TAKE TURNS TO CALL OUT A BLOCK NAME ON THE GRID - FOR EXAMPLE "A3".



- 3 YOUR OPPONENT MUST TELL YOU IF PART OF A SHIP IS THERE OR NOT. IF IT IS NOT, MARK THAT BLOCK WITH A CROSS (X). IF THERE IS, COLOUR THE BLOCK IN.



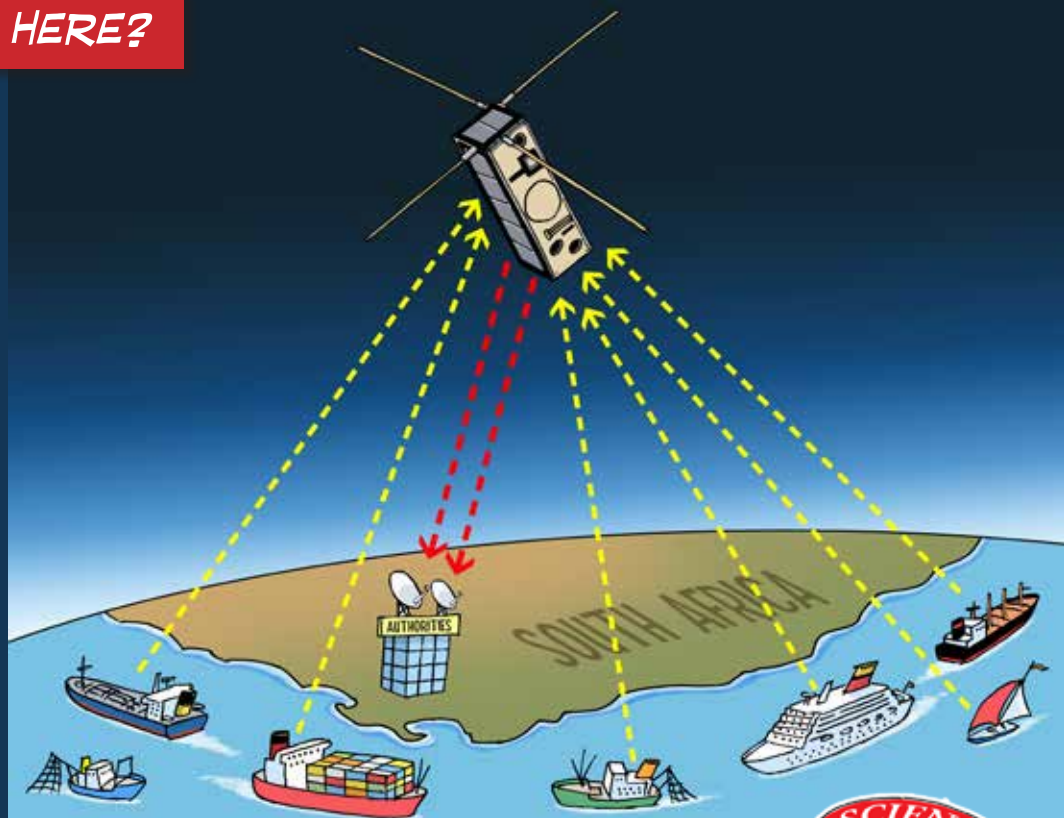
- 4 ONCE YOU HAVE FOUND ALL THE BLOCKS THAT A SHIP IS IN, YOUR OPPONENT MUST SAY, "SHIP FOUND." THE WINNER IS THE PERSON WHO CAN FIND ALL THEIR OPPONENT'S SHIPS FIRST.

WHAT'S HAPPENING HERE?

In the game, did you find it difficult to find your opponent's ships?

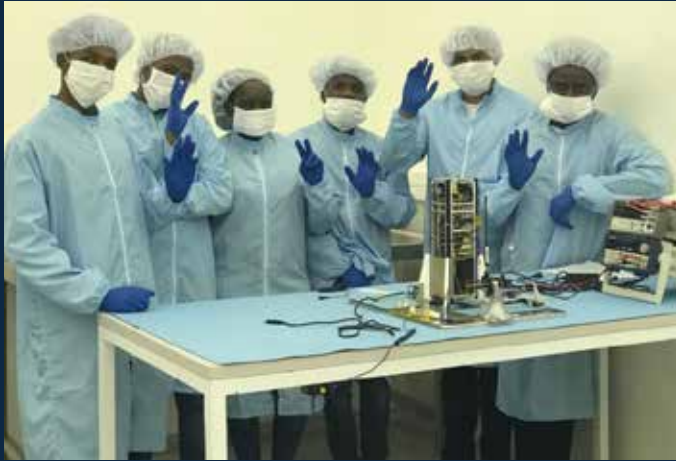
The ZACube2 nanosatellite has "Automatic Identification System" (AIS) technology that makes it easier to find ships.

The ships send information to the satellite which then sends it on to people on the ground who are monitoring them.



THERE IS MORE TO COME...

The ZACube2 was developed right here in South Africa at the Cape Peninsula University of Technology (CPUT) by students and staff.



Source www.cput.ac.za

Are you wondering why these people are wearing masks and funny coats? It is to protect the satellite from *dust* which could affect the way it works when it is up in space. In fact, the satellite was made in a special "*clean room*" which is free from dust!

CAREERS:

Software engineers were involved in designing, making and testing of the computer programs used on the ZACube2 satellite. They will maintain the software once it is in orbit. Software engineers are needed wherever computers control machines or systems.

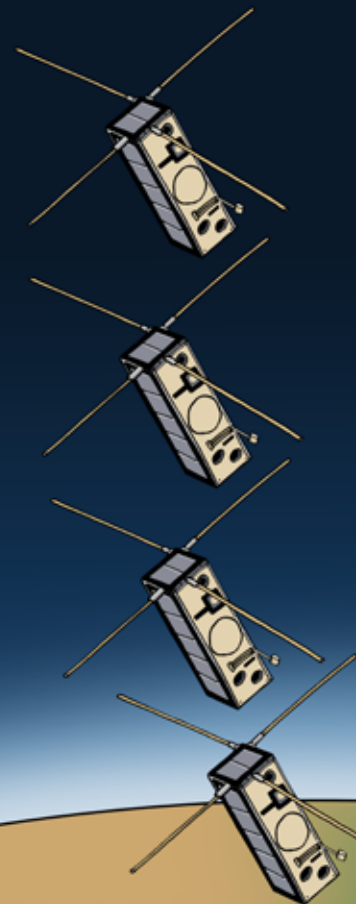
Mechanical engineers design and make mechanical systems. In other words they make machines - which could include aeroplanes, machines in industrial plants, robotics, medical devices ... and the ZACube2 satellite.

Industrial engineers: Many people, systems and processes were involved in the making of the ZACube2 satellite. Time and money were spent, and knowledge, information and equipment would also have been needed. An industrial engineer would have looked at all these things to make sure the satellite was made the best it could be with the least amount of waste.



Nyamko Royi has a Masters degree in Electrical Engineering. He designs systems to make sure that small satellites (like the ZACube2) can communicate with the operators on Earth, and that the operators can communicate with the satellite. Imagine knowing that the communication system you designed is being used in a satellite that is in space! For Nyameko, this is the part of the job that he really enjoys.

The ZACube2 is the first in a planned satellite constellation, which means the scientists at CPUT are going to be developing more of these little satellites and putting them into space.



CURRICULUM LINKS

- *Grade 7, 8 & 9: Technology – Structures*
- *Grade 9: Technology – Design skills*
- *Grade 7, 8 & 9: Mathematics – Space and Shape (Graphs).*

Knowledge is NCAH!



PUZZLE YOUR MIND!!!

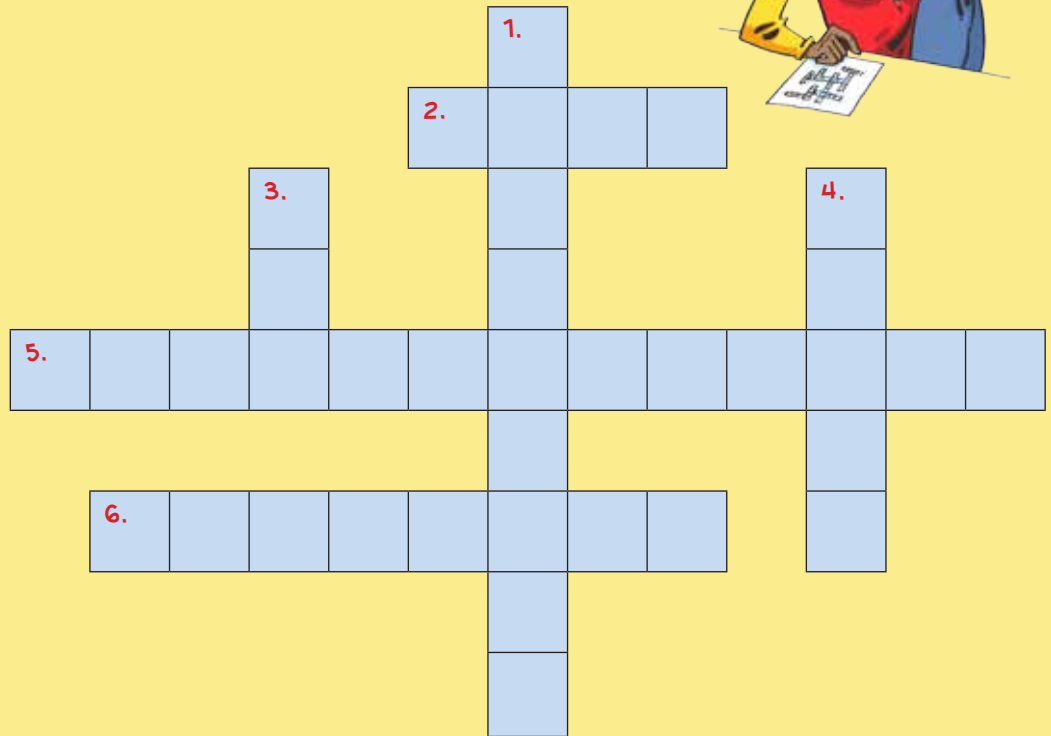
USE THESE CLUES TO FIND THE WORDS IN THE PUZZLE:

Across

2. a word that means small
5. a word that describes a whole lot of satellites that work together
6. the other thing that ZACube2 will monitor

Down

1. something that is put in space that can help monitor things on Earth
3. automatic identification system
4. they go on the ocean



Puzzle answers: Across:

START YOUR OWN SCIENCE SPAZA

Do you want to start a science club at your school? Send us the following information, and Science Spaza will contact you.

School: _____

Name: _____

Telephone number: _____

Email address: _____

Postal address: _____

Visit www.sciencespaza.org, email info@sciencespaza.org, sms or WhatsApp us on 076 173 7130 or write to us at PO Box 22106, Mayor's Walk, 3208.

WE WANT YOUR FEEDBACK!

TELL US WHAT ELSE YOU KNOW ABOUT SATELLITES SO WE CAN POST IT ON OUR FACEBOOK PAGE TO INSPIRE OTHER YOUNG SCIENTISTS.



The Department of Science and Technology contributes to increased well-being and prosperity through science, technology and innovation. For more information visit: www.dst.gov.za.

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