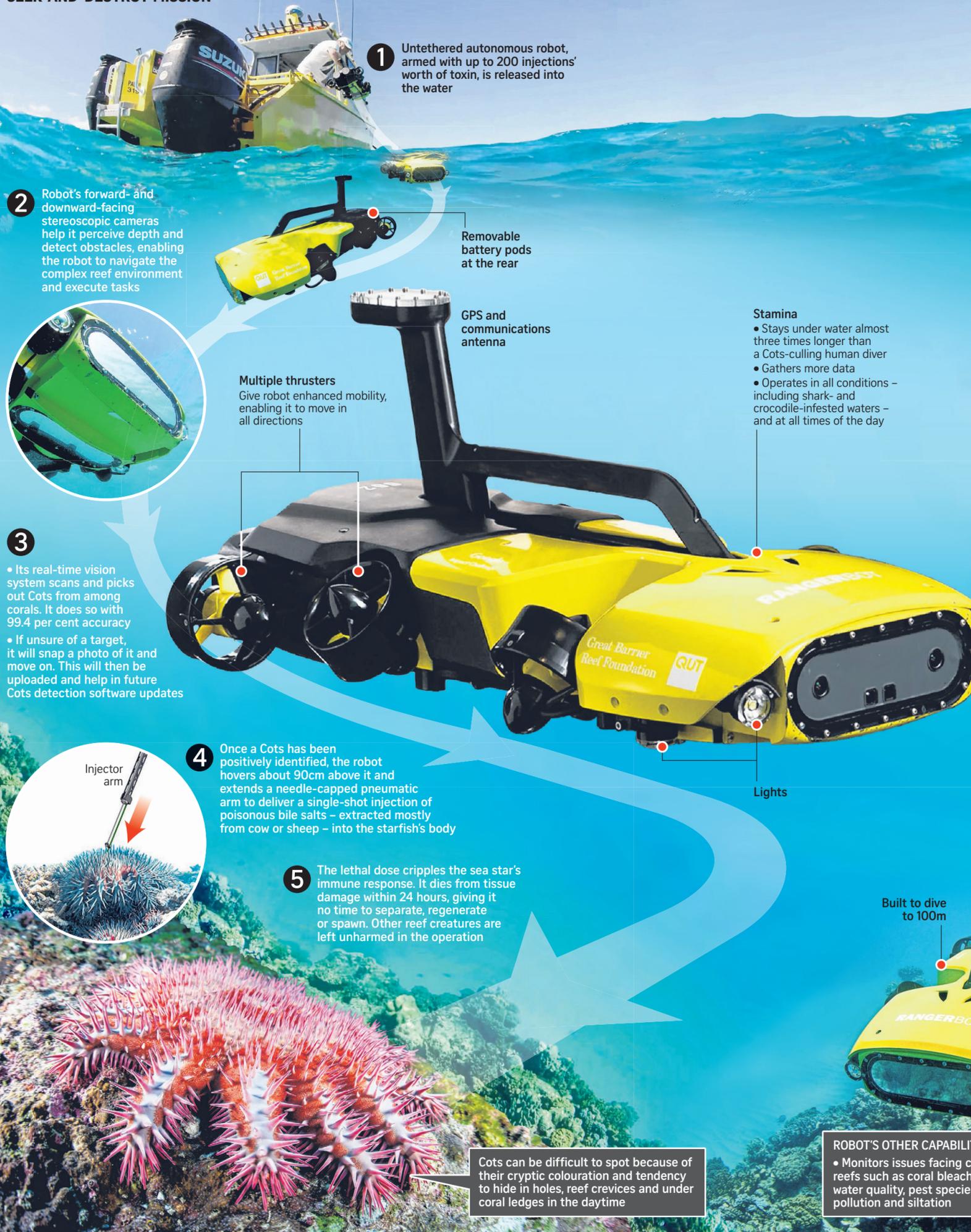


# Robo 'saviour' of the reef?

Since 2010, the sporadic population booms of native, coral-eating crown-of-thorns starfish (Cots) have been affecting the survival of Australia's Great Barrier Reef – but help is at hand. RangerBot, an underwater drone unveiled in August, is touted as the latest weapon to hunt and kill the marauding sea stars.

It is a collaboration between Queensland University of Technology (QUT), Google and the Great Barrier Reef Foundation. Infographics journalist Lim Yong dives in for a peek at this "silent assassin", the world's first underwater robotic system designed specifically for coral reef environments.

## SEEK-AND-DESTROY MISSION



## ANATOMY OF AN 'ASSASSIN'

**What is it?**

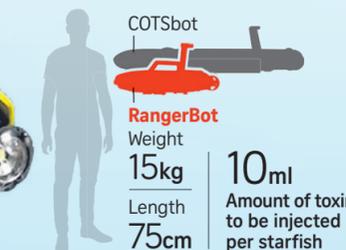
- An upgrade of QUT's original prototype, COTSbot (below), which won the 2016 Google Impact Challenge – a competition that helps non-profit organisations develop technologies to tackle the world's social challenges
- Smaller, more versatile, easier to use and more than seven times cheaper to build than its predecessor



Operated using a smart tablet



## BY THE NUMBERS



**5** Operational RangerBots to date (Undergoing specific testings, reviews and approvals by various parties)

**8** hours Battery life with a single charge

Between **9,000** and **16,000** sq m\* Area a robot covers in an eight-hour span  
\*Dependent on factors such as the terrain and its speed

**A\$750,000** (\$738,000) Google's funding in the project



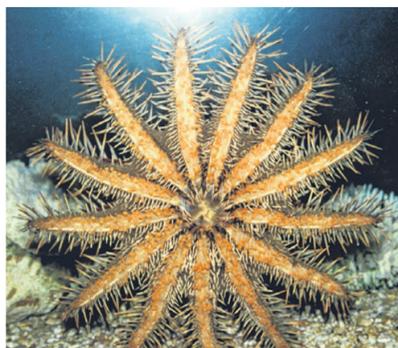
## ROBOT'S OTHER CAPABILITIES

- Monitors issues facing coral reefs such as coral bleaching, water quality, pest species, pollution and siltation
- Helps map expansive underwater areas – at scales not previously possible – for reef research and management

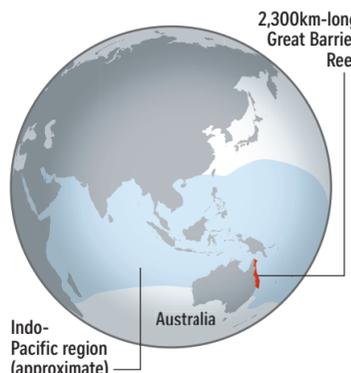
## CROWN-OF-THORNS STARFISH (*Acanthaster planci*)

Coral cover at the World Heritage-listed Great Barrier Reef (GBR) between 1985 and 2012 fell by about 50 per cent, and nearly half of that decline is attributed to Cots. Cots has been identified as one of three major threats to the GBR, along with coral bleaching and cyclone damage.

- What is it?**
- A marine invertebrate that inhabits reefs throughout the Indo-Pacific region and feeds on coral polyps
  - Varies from pale brown and grey-green to garishly bright colours
  - Grows up to 21 arms with hundreds of 4cm-long toxin-tipped spines
  - It has more than 600 ovaries and spawns up to 50 million eggs a year



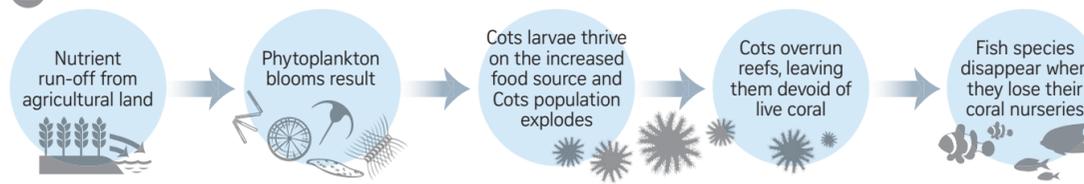
- One such starfish can consume live coral at a rate of 5-13 sq m per year
- In small populations they pose little harm, and arguably help keep reefs diverse and healthy
- 25-35cm in diameter (some reach 80cm)



## Cots outbreaks and how they impact reefs

There have been four major outbreaks on the GBR since the 1960s. Exact causes of Cots outbreaks cannot be ascertained but many experts agree it is unlikely that they can be attributed to a single factor. Below are two of the most widely accepted hypotheses.

- Removal of Cots' few natural predators – such as the giant triton, a large predatory sea snail – and Starry pufferfish
- Triggered by extra nutrients in the water



An infestation is under way when Cots of different sizes are seen aggregating in large numbers.