

Mammoth search effort at sea

THE STRAITS TIMES looks at what happened when the KRI Nanggala-402 went missing, and what is involved in the effort to search for it

TIMELINE

The information on what happened on Wednesday was given by Indonesia's navy chief Yudo Margono at a news conference yesterday. All are in Central Indonesian Time (WITA), the same time logged in Bali and Singapore.

WEDNESDAY, April 21

- 3am** KRI Nanggala-402 requests permission to dive at a depth of 13m and prepares to fire a torpedo. In line with procedure, the submarine is accompanied by a searider.
- 3-3.30am** The submarine's bow is visible to the searider from a 50m distance.
- 3.30am** Other navy vessels get into position to launch the torpedo.
- 3.46am** The searider monitors the periscope and the submarine's identification light slowly dims and disappears.
- 3.46-4.46am** The vessel fails to respond to several calls. The periscope, which should have been visible, vanishes. Communication with the vessel is cut off.
- 4.17am** A helicopter is dispatched to try to locate it visually but this yields no result.

YESTERDAY

- 5.15am** The submarine is scheduled to resurface but does not appear. The navy then follows procedures for what to do when a submarine loses contact or experiences problems.
 - 6.46am** The navy launches a search effort to look for the KRI Nanggala-402, and training is postponed.
- Indonesia deploys six military vessels and a helicopter in its search effort, at the last known position of the submarine in waters off north Bali. The ships include underwater oceanographic vessel Rigel. Indonesia later says it is deploying 14 more vessels to join the search.
- The Republic of Singapore's submarine rescue vessel MV Swift Rescue is expected to arrive in Bali waters tomorrow, says an Indonesian military spokesman.
- A submarine rescue ship of the Royal Malaysian Navy, MV Mega Bakti, is expected to arrive on Sunday.
- Indonesia's Defence Ministry says Australia is sending HMAS Ballarat and HMAS Sirius, India is sending one vessel and the United States a Poseidon aircraft.
- Offers of assistance have also come from the United States, Germany, France, Turkey, South Korea and Russia.

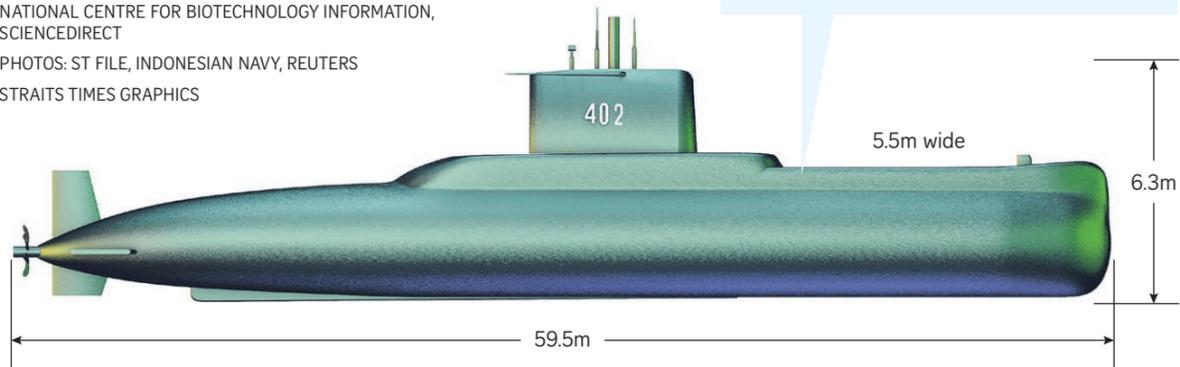


THE KRI NANGGALA-402 SUBMARINE

- Weight: 1,395 tonnes
- Powered by four electric diesel engines
- Speed: Up to 21.5 knots when submerged and 11 knots when cruising on the surface
- Can carry up to 14 torpedoes
- It was ordered by Indonesia in 1977 and completed in 1980
- On July 6, 1981, the submarine officially became an Indonesian Navy warship with a base in Ujung, Surabaya

Sources: INDONESIA NAVY, REPUBLIC OF SINGAPORE NAVY, NATIONAL CENTRE FOR BIOTECHNOLOGY INFORMATION, SCIENCEDIRECT

PHOTOS: ST FILE, INDONESIA NAVY, REUTERS STRAITS TIMES GRAPHICS



An undated handout photo made available by the Indonesian Navy shows the KRI Nanggala-402 during a mission.



What could happen to a person stranded inside a submarine as atmospheric pressure builds up

Ruptured eardrum

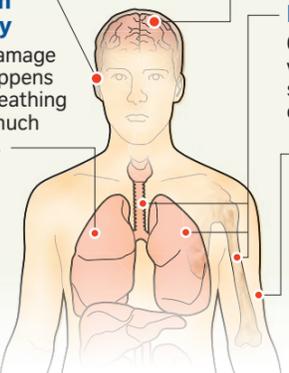
- Severely out-of-balance air pressures in the middle ear and the environment can rupture the eardrum.
- Can lead to hearing loss and cause the middle ear to be vulnerable to infections.

Nitrogen narcosis

- Nitrogen enters the bloodstream at increased pressure.
- Can result in impaired judgment and loss of fine motor control.
- In severe cases, people can enter a coma or die.

Oxygen toxicity

Lung damage that happens from breathing in too much oxygen.



Barotrauma

Occurs when gases in various body organs/structures get compressed.

Decompression sickness

- Sudden return of pressure to normal can lead to gas bubbles arising in tissues or blood.
- Can be life-threatening.

MV SWIFT RESCUE

- Singapore's submarine support vessel (below) is on its way to assist.
- Dimensions: 85m by 18m
- Weighs 4,300 tonnes
- Travels at up to 12 knots
- Carries a crew of 27
- Can operate up to 28 days at a time
- It also has a helipad for emergency evacuations, a medical centre with eight beds for intensive care and a 10-bed sick bay.



DSAR 6

- A submersible rescue vessel – Deep Search and Rescue Six (DSAR 6, left) – can be launched from the MV Swift Rescue.
- DSAR 6 can go underwater and connect with the injured submarine, ferrying the submarine crew to safety.
- The DSAR 6 then returns to the MV Swift Rescue and is docked within a recompression chamber. The chamber can hold up to 40 patients and has medical staff on hand.
- 9.6m by 3.2m by 2.8m
- Weighs 25 tonnes
- Can carry up to 17 people and a crew of three
- Travels at up to 3 knots
- Can go up to 500m underwater
- Can travel up to 15 hours at a time