

## 7. Robotics

Most robots do not resemble the way they are depicted in science fiction books, films and on television, but are useful special purpose IT systems. They are increasingly used both in the home and industry. For example, a robotic lawn mower can be set to mow the lawn at intervals programmed by the owner, returning to a docking station to recharge as necessary. Robotic paint sprayers have been used to paint cars for over 20 years.

Another area where robots are being developed is in warfare.

The cruise missile is a weapon that can travel thousands of kilometres in order to hit a pre-determined target. It is accurate enough to be aimed at a single building. Cruise missiles are able to fly low, following the terrain, so that they avoid detection by enemy radar. It is also possible to select a new target by providing the global positioning system (GPS) coordinates after the missile has been launched.

Future developments could include the missile being able to decide on its approach whether the target is friend or enemy, preventing the possibility of the cruise missile striking friendly forces. One day, robotic weapons could be given a degree of autonomy where they could make their own decisions about whether to kill or not. Some people think that there should always be a human involved in this decision making process but others think that such decisions should be based on logic rather than human judgment.



[Source: [www.defenseimagery.mil/imagery.html#a=search&s=%20USS%20Merrill](http://www.defenseimagery.mil/imagery.html#a=search&s=%20USS%20Merrill) and [www.defenseimagery.mil/imagery.html#a=search&s=%20USS%20tomahawk](http://www.defenseimagery.mil/imagery.html#a=search&s=%20USS%20tomahawk) from U.S. Department of Defense, 9 September 2009. ]

*(This question continues on the following page)*

*(Question 7 continued)*

- (a) Describe how IT systems can enable the missile to fly close to the ground and hit the intended target. *[6 marks]*
  
  - (b) Analyse whether it is acceptable that autonomous machines should be allowed to fight in wars. *[6 marks]*
  
  - (c) To what extent could a cruise missile be considered a robot? *[8 marks]*
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