



A Longitude Prize for the twenty-first century

The UK Government's new prize for substantial innovation to address pressing societal problems should be welcomed, says **Martin Rees**.

It is 300 years since the British government pioneered a new approach to problem-solving. The Longitude Act of 1714 offered a prize of £20,000 (worth more than £1 million today) to anyone who could devise an accurate method to determine a ship's position at sea. Among those on the committee that judged the merit of the entries was the serving Astronomer Royal.

History is repeating itself. In 2014, there is a pressing need for the United Kingdom to channel more brainpower into innovation, to jump-start new technologies and to enthuse young people. There are broad societal problems that demand fresh thinking. So Britain is reconvening the historic Longitude Committee, this time with a promised reward of £10 million (US\$17 million). Some things are different: in 2014, the challenge to be addressed by the Longitude Prize will be decided not by government officials, but by the public. And some things are the same: as Astronomer Royal, I chair the resurrected committee.

Starting on 22 May, after detailed examination by the BBC science programme *Horizon*, the public will be able to vote on the theme of the prize from a shortlist of six broad topics, each important to human welfare and each offering scope for creativity: dementia; access to safe, clean water; treating paralysis; antibiotic resistance; food and nutrition; and flight. The outcome of the vote will be announced on 25 June. An expert group will then define and set the rules for a specific challenge.

On flight, for example, the challenge for scientists and engineers could be to reduce the environmental impact of air travel. On dementia, it could be to find a way to help people with dementia to live independently for longer. The £10-million prize fund will be open for five years as a reward for the best answer to this single specific problem — although the prize could be configured (as was the challenge of 1714) so that rewards are offered for intermediate steps.

The new Longitude Prize was first announced by Prime Minister David Cameron last year. Some are likely to be sceptical of its effectiveness. I think they are wrong.

A well-designed prize should unleash investment from many quarters, amounting to much more than the prize itself, by enhancing the competitive focus on a challenge important for human welfare. The contest should also be newsworthy enough to raise the profile and reputation of innovators, and to stimulate young people's interest and enthusiasm — and that could in itself have substantial social value. For an individual or small company, the prize money is a significant incentive; for a big company, the publicity will be more important. Thus both have a motive for participating.

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The original longitude challenge was the talk of London's coffee-houses. In the eighteenth century, Britain was a maritime power striving against Spain and the Netherlands to rule the waves. Many ships were wrecked because there was no way to keep precise track of longitude.

Astronomers believed that the answer would come from the stars. John Harrison, a working-class joiner and clockmaker with little formal education, came closest to receiving the reward money through his extraordinary mechanical talent and determination, culminating in his H4, the marine chronometer still on display at the Royal Observatory in London.

In the subsequent 300 years, the 'challenge prize' concept has been widely emulated — for instance, a prize was the stimulus for Charles Lindbergh's first transatlantic flight. In the United States, the publicly funded Defense Advanced Research Projects Agency (DARPA) has sponsored competitions for driverless vehicles. The total investment by contestants — private entrepreneurs and universities — has been much more than the \$6.5 million offered in prizes.

Pre-eminent in such ventures in the United States is the X-prize Foundation in Culver City, California, which oversees and monitors privately sponsored prizes. Its ambition is to revitalize markets that are currently "stuck due to existing failures or a commonly held belief that a solution is not possible". The first X-prize, for privately developed sub-orbital space flight, was awarded in 2004.

This type of prize has advantages over more conventional awards. The winner is decided objectively — as in athletics, and unlike the

Oscars and literary prizes. And such prizes recognize and boost up-and-coming talent — unlike the Nobel and similar prizes, for which recognition may be delayed for decades.

The original Board of Longitude lasted more than a century, and offered rewards for further discoveries and innovations. It was, in a way, the precursor of Britain's current Research Councils, Technology Strategy Boards, and so on. No longer is there a manifest number-one problem as there was in the eighteenth century. Today's research agenda is hugely more diverse and on a much larger scale; both public and private sectors provide many incentives and pathways to innovation that did not then exist. The £10-million offered by the new Longitude Prize is less than a thousandth of what Britain spends each year on research and development. But I am confident that it could have a disproportionate impact: it is surely an experiment worth trying. ■

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