

## A dangerous game in space



Is China's satellite zapping simply old-fashioned sabre-rattling? Or is it a rational step to restrict the use of space weapons?

Philip Ball

How do you reconcile China's shooting down of a satellite earlier this month with the subsequent insistence by its foreign ministry spokesman, Liu Jianchao, that China opposes military competition in space?

China has not yet explained its objectives. But the action makes perfect sense in the context of game theory, the conventional framework for analysing conflict and cooperation.

Put simply, if you want to spur nations to collaborate in curbing space militarization, good intentions are not enough. You need to show that you can get tough if the need arises.

A benign interpretation of China's action, then, is that it might accomplish what years of talking have not: force the United States to negotiate an international treaty on space weaponry. Does China have such a specific goal in mind? Or does it merely wish to leave its options open in dealing with rebellious Taiwan?

These are dangerous questions. But it is worth bearing in mind that the Chinese test is at least consistent with a completely rational approach to securing international enforcement of the peaceful use of space.

The classic scenario to explore cooperation between nations using game theory is the Prisoner's Dilemma. Here, two players are each given the choice of cooperating with each other or betraying the other person (defecting), with different rewards or penalties for each potential outcome. Mutual cooperation is more beneficial to both players than is mutual defection. But temptation gets in the way: the player who defects against a cooperator wins the biggest prize of all.

Although the rational strategy in a one-off bout of the Prisoner's Dilemma is to defect, it runs against self-interest in repeated rounds. Then, the most successful way to play is often a 'tit-for-tat' strategy, in which a player will initially cooperate, then respond in kind to the other player's previous choice.

Robert Axelrod, the political scientist at the University of Michigan in Ann Arbor who pioneered the study of Prisoner's Dilemma strategies, points out that in the real world, players who follow the tit-for-tat strategy need to cultivate a reputation for toughness. Other players must know that provocation will be met with retaliation. In the case of China, the message could be that the militarization of space will not be prevented simply by condemning it, but rather by showing that you can and will play the game if necessary.

The real world is, of course, not a computer simulation, in which the agents are rational. Although game theory is studied in defence-policy circles, no one denies that it gives little more than a cartoon picture of international relations.

But in this case the model fits. China and Russia have been calling for years for a treaty to constrain space weapons. Not only have these calls been ignored by the United States, but last year the White House issued perhaps the most aggressive policy statement about space since the chilliest days of the Cold War. It stated baldly that the United States "will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit US access to or use of space."

The document not only asserted the United States' right to pursue its "national interests" (including "foreign policy objectives") by preserving its "freedom of action" in space, but also threatened to deny adversaries the same freedom.

Is China an 'adversary'? Friendly overtures between NASA and the China National Space Administration might suggest otherwise, but NASA is not the Pentagon. The United States is not only still pursuing its national missile-defence programme but is also developing laser-based weapons that can knock out satellites from the ground or aircraft. It is hardly surprising then, that anyone who is serious about stopping such a relentless and defiant pursuit of space weaponry through international agreement will deploy the bullish lessons of game theory.

This is not to say that the Chinese test is defensible. It is understandable that its neighbours, such as Japan and Australia, should be dismayed by it, and that Taiwan should regard it as an act of aggression. And there is every chance that the United States will interpret it as the opening shot of an arms race rather than as a summons to the negotiating table.

China might think that keeping a strong hand relies on not making its intentions too explicit. All the same, there is a difference between developing space weapons at the same time as opposing the militarization of space, and developing weapons while refusing to ban them. Which would you prefer?

Visit our [dangerousgameinspace.html](#) newsblog to read and post comments about this story.