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KEY TAKEAWAYS

- Nuclear command, control and communications (NC3) satellites are vital to states' nuclear deterrence apparatus. Their increasing vulnerabilities heighten risks for unintended escalation, with potentially catastrophic consequences.

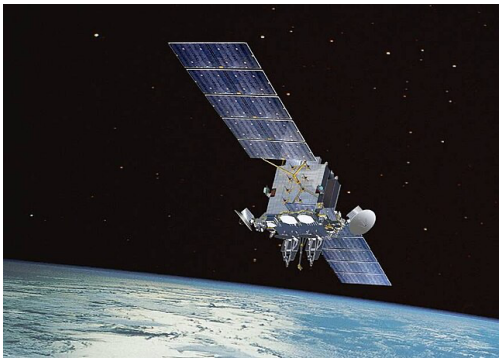
- A political commitment by major powers not to target NC3 satellites offers a low-cost confidence-building measure that can bridge competing visions for space security.

- Such a declaration would represent a significant first step toward shaping norms in an increasingly unstable environment.

COMMENTARY

The United States is projected to spend US$154 billion between 2025 and 2034 modernising its NC3 architecture. This reflects a growing concern about nuclear security and the need to mitigate the growing threats to these systems.

NC3 networks enable nuclear-armed states to manage their arsenals and make informed decisions by providing situational awareness, early warning, secure lines of communication, and other critical elements of nuclear strategy. Much of this activity now relies on space-based assets, which provide real-time missile launch detection, encrypted communications, and key positioning and timing data, making them particularly vital during times of crisis. NC3 satellites are therefore critical to a credible nuclear deterrent.



NC3 satellites are critical yet vulnerable components of nuclear deterrence. A political commitment by major powers not to target them could reduce escalation risks and rebuild trust in the space–nuclear nexus. *Image source: Wikimedia Commons.*

Recent high-level declarations have begun to acknowledge this vulnerability. The Biden–Xi statement (November 2024) and Mexico's UN General Assembly resolution (November 2025) both reaffirmed that decisions on nuclear weapon use must remain under human control. While these commitments reflect growing awareness of NC3's digital transformation, they have not yet addressed the infrastructural issue. The key challenge is therefore to translate shared concern into reciprocal commitments that protect these systems and reduce mutual risks of escalation.

NC3 Satellites Increasingly at Risk

The space segment of NC3 systems operates in an increasingly hostile and volatile environment. NC3 satellites are few in number, mostly concentrated in the hands of three major powers (United States, Russia, and China). Any disruption would significantly harm warning and communication functions. They represent a particularly vulnerable segment of the deterrence architecture.

NC3 systems are increasingly digitalised, which expands the potential for intrusion, spoofing, or data manipulation. Even if most of these cyber operations are physically non-destructive, they could trigger dangerous responses based on false information.

Responding to these threats is further complicated by the difficulty of attribution. When states cannot reliably identify attackers, attributing responsibility and retaliating proportionately becomes almost impossible. This volatility enables destabilising actors to take pre-emptive or retaliatory moves with minimal risk of consequences.

The Case for a Political Commitment

Efforts to restrain military behaviour in space are not new. Since 2008, China and Russia have promoted a ban on space-based weapons through the Treaty on the Prevention of the Placement of Weapons in Outer Space (PPWT), while the United States promoted voluntary norms, with its 2022 DA-ASAT test moratorium serving as a politically binding step rather than a legal ban.

An NC3-satellite non-targeting commitment could bridge this divide, offering a low-cost but symbolically powerful signal of restraint. It would reaffirm that the core

communications and early-warning assets of nuclear deterrence must remain off-limits, even amid heightening strategic rivalry.

However, such a declaration might not be perceived equally. Although a commitment by the United States, Russia, and China not to target one another's NC3 satellites appears symmetrical on paper, Beijing in particular may view it as disproportionately benefiting Washington. As the largest nuclear and space power, with the most extensive NC3 infrastructure, the United States could be seen as locking in asymmetry and undermining balanced deterrence.

To secure Chinese participation, the declaration would likely need to be part of a broader package of measures on space and nuclear security. This could include mutual pledges on responsible space behaviour, restrictions on counter-space testing, and cybersecurity confidence-building measures related to NC3 systems.

Such a statement could also help bridge the gap between space and nuclear communities. Although discussions on "responsible behaviour in space" are advancing at the UN Open-Ended Working Group (OEWG), NC3 satellites are rarely mentioned directly. Including them as "assets of special value" or "critical infrastructure" within that framework could be a good way to start the discussion in an inclusive manner.

The main challenges to reaching such an agreement lie in the scope, definitions, and verification. Many NC3 satellites are not officially identified as such or formally registered, since they represent sensitive national security assets. Agreeing on a definition of what constitutes an NC3 satellite or an attack would be difficult. Furthermore, as a political commitment would be unlikely to have a verification mechanism, parties would rely on their own national technical means to monitor compliance.

These limitations are not fatal. A political declaration's aim is not to establish a legally-binding instrument. Instead, it serves as an important starting point for building transparency and trust around some of the most sensitive space assets.

Possible Framework

There are various possible forms for such a declaration, from a simple unilateral statement to a bilateral or trilateral joint statement. The declaration could be standalone or part of a package of announcements following a bilateral or trilateral meeting.

Different scenarios are conceivable, with varying levels of credibility. The United States could make a unilateral statement, similar to the DA-ASAT moratorium, affirming its intention not to target NC3 satellites, leading to discussions in arms control and strategic stability talks. This could result in a joint statement by the United States and Russia, and perhaps even China. This would build on Cold War precedent, where the United States and Russia held a tacit agreement not to target each other's nuclear infrastructure since it threatened both powers' survival. In addition, or alternatively, the topic could be added to the P5 agenda, leading to a joint statement potentially endorsed by a UN Security Council resolution.

Given current tensions, especially with the revival of debates around restarting nuclear testing, the most realistic short-term outcome would be a simple declaration, either unilateral or bilateral, that recognises the seriousness of the threats and provides a hook for the issue to be discussed in relevant fora.

Where to discuss this issue is not straightforward. Although NC3 sits at the intersection of space, nuclear, and cyber policy, it is not being discussed by the three major nuclear powers. The cyber track could be the best option, as this process has made more progress than deadlocked nuclear and space security bodies. In space-security fora, it could be addressed at the OEWG, under "responsible behaviour" or "protection of critical space-based services", though likely contentiously. Discussions in Track 2 and Track 1.5 dialogues may be the most realistic format at present, bringing together nuclear, cyber, and space specialists in a less politicised environment.

Conclusion

A political declaration not to target NC3 satellites would represent a modest but meaningful step towards rebuilding trust in the space–nuclear nexus. It would promote nuclear risk reduction, protect the basis of deterrence, and recognise that technological competition should have limits. Given the current context, major powers may hesitate to constrain themselves, which is why even a brief statement from strategic-stability dialogues would send an important signal.

History shows that practice can precede law. Moratoria can be useful first steps in establishing norms. Recognising NC3 satellites as off-limits would be an important contribution to reducing escalation risks and a significant confidence-building measure in today's deteriorating strategic environment.

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