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Space Technology as a Tool for Peacebuilding and Conflict Prevention in Nigeria: Opportunities, Challenges and Policy Implications

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Abstract- ***Nigeria's security problems are rarely confined to one place, one cause, or one institution. Insurgency, banditry, farmer–herder violence, communal disputes, kidnapping, illegal resource extraction, climate-related displacement and election-related violence are shaped by a mixture of political, economic, environmental and social conditions. Many of these pressures are particularly difficult to monitor because they develop across large rural spaces, border areas and communities where reliable, timely information is limited. Space technology offers a way of improving that information base. Earth observation, satellite communications, global navigation satellite systems, satellite meteorology and geospatial analysis can help public institutions identify changes, assess vulnerability, maintain communication, plan humanitarian access and monitor conditions that may precede or accompany violence. This article develops the Space Technology–Peacebuilding Nexus (STPN) Model as a framework for explaining how space-derived information can contribute to prevention without turning technology itself into the supposed solution to conflict. The model is built around five linked stages: risk sensing, contextual interpretation, preventive decision, peacebuilding response, and accountability and learning. It draws on human security, conflict-transformation and systems perspectives to argue that the value of space technology depends on what happens between the production of information and the response to it. Using qualitative doctrinal and integrative literature-review methods, the article examines Nigerian space-policy institutions, relevant legislation, early-warning arrangements and scholarship on remote sensing and conflict monitoring. The analysis finds that Nigeria already has important building blocks, including the National Space Research and Development Agency (NASRDA), Earth-observation experience, satellite communications capabilities, the Defence Space Administration and emerging national and regional early-warning structures. At the same time, fragmented institutional mandates, financing and skills gaps, weak civil–security coordination, data-quality problems, privacy concerns and the risk of excessive surveillance can prevent space-derived information from producing peaceful outcomes. The article argues for a civilian-led geospatial peace and early-warning architecture that combines satellite evidence with community knowledge and established conflict-prevention mechanisms. It recommends stronger data governance, clear response protocols, investment in analytical and subnational capacity, responsible civilian–security coordination, and pilot testing of the STPN Model in different Nigerian conflict settings. The central argument is straightforward: satellites can help Nigeria see risks earlier, but seeing a risk is not the same as preventing violence. Prevention occurs when reliable information is interpreted in context and translated into timely, proportionate and accountable action.***

Keywords: Nigeria; space technology; peacebuilding; conflict prevention; early warning; remote sensing; satellite imagery; geospatial intelligence.

I. INTRODUCTION

Nigeria's conflict environment is too varied to be understood through a single security lens. Violent extremism has affected communities in the North-East, while banditry and kidnapping have created insecurity across parts of the North-West and North-Central regions. Farmer–herder disputes continue to intersect with questions of land, water and mobility. Communal violence, separatist tensions, insecurity around natural resources and climate-related displacement add other layers to the picture. These conflicts are different, but they often share a common feature: what happens on the ground is closely connected to where it happens.

Geography affects access to water, agricultural land, grazing routes, forests, roads, borders, mining areas and public services. It also affects the ability of governments, humanitarian organisations and communities to observe and respond to emerging risks. In a large country such as Nigeria, conventional field-based monitoring cannot always provide a timely picture of changing conditions, particularly in remote or insecure areas. This is one reason space technology deserves attention within discussions of conflict prevention and peacebuilding.

Earth-observation satellites can provide repeated observations of large areas. They can help identify land-use changes, flooding, vegetation stress, burned areas, settlement expansion, damaged infrastructure and other physical changes. Satellite communications can maintain links where terrestrial networks are weak or disrupted. Global navigation satellite systems can support mapping, logistics and emergency operations, while satellite meteorology can provide information relevant to flooding, drought and other environmental pressures. Geospatial systems can then bring these different sources together with administrative, demographic, conflict-event and community information.

The relevance of these capabilities is supported by existing research. Remote sensing has been used in peace and security work to monitor damaged infrastructure, track displacement, examine environmental change, support humanitarian operations and document events in places where direct observation is difficult. Avtar et al. (2021), for example, identify the value of near-real-time and broad-area observation while also stressing problems of cost, sensor differences, classification uncertainty and limited ground verification. Research focused on Nigeria has also found that satellite-derived characteristics can contain information associated with subsequent conflict-fatality risk. Goodman, BenYishay and Runfola (2024), using Landsat 8 imagery and ACLED conflict-event data, reported predictive performance above 75 per cent on average across the years examined.

Such findings are useful, but they need to be read carefully. A model that identifies a high-risk location does not necessarily explain why violence will occur there. Nor does it tell policymakers which intervention will prevent it. A satellite image can show a change in vegetation, settlement or land use; it cannot by itself explain a community's history, the legitimacy of a land claim, the intentions of an armed group or the political interests behind a dispute.

That distinction is at the heart of this article. Space technology should be treated as an information-enabling capability rather than as an independent peacebuilding actor. Its contribution begins with better information, but peacebuilding depends on what institutions and communities do with that information. A warning that arrives too late, is not trusted, is misunderstood or is not connected to a credible response may have little preventive value. Worse, information produced for peacebuilding can cause harm if it becomes a tool of poorly regulated surveillance or coercion.

The article therefore asks: how can Nigeria use space technology to strengthen peacebuilding and conflict prevention while managing the institutional, technological and rights-related risks that accompany its use? It makes three related contributions. First, it brings together the principal opportunities and limitations of space technology in Nigeria's conflict environment. Second, it proposes the STPN Model as a framework for connecting space-derived information with locally legitimate preventive action. Third, it identifies policy choices that could help Nigeria build a more coherent space-enabled prevention architecture.

Conceptual and Theoretical Framework

Understanding Space Technology

For this article, space technology includes technologies and services made possible by space-based assets or by data derived from them. The term therefore extends beyond satellites themselves. It includes Earth-observation imagery, geographic information systems and geospatial analysis, satellite communications, global navigation satellite systems, satellite meteorology and climate monitoring, and data platforms capable of combining geospatial information with administrative, conflict-event and community-generated data.

This broader definition matters because the peacebuilding value of space technology does not come from an image in isolation. An image becomes useful when it is processed, compared with other information, interpreted and connected to a decision. A flood map, for example, becomes more useful when it is combined with information about roads, settlements, health facilities and vulnerable populations. The same principle applies to conflict prevention.

Peacebuilding and Conflict Prevention

Peacebuilding is concerned with the conditions that make peaceful political and social relations possible. It includes efforts to reduce violence, address structural grievances, strengthen institutions for peaceful dispute settlement, promote reconciliation and improve social cohesion. It is therefore broader than the immediate containment of violence associated with peacekeeping.

Conflict prevention is similarly broader than simply stopping an attack. It can involve structural measures such as fair access to resources and better governance, as well as operational measures such as early warning, mediation, preventive deployment, humanitarian assistance and dialogue. The ECOWAS Conflict Prevention Framework treats early warning as a means of providing incident and trend information together with preventive response options. The important point is that information is valuable because it creates an opportunity for action before a situation deteriorates.

Theoretical Perspectives

Three perspectives provide the foundation for the STPN Model. The first is human security. This perspective shifts attention from the protection of the state alone to the safety, dignity and livelihoods of people and communities. From this standpoint, satellite imagery matters when it helps identify threats to civilians: flood exposure, crop stress, blocked humanitarian routes, destroyed settlements, displacement or damage to schools and health facilities.

The second is conflict transformation. Conflict transformation treats violence as part of changing relationships, institutions, narratives and inequalities. A satellite-detected environmental change should therefore be treated as a prompt for further inquiry rather than as proof of a particular cause. A shrinking water body may increase pressure on farmers and pastoralists, but whether that pressure becomes violent depends on relationships, institutions, perceptions and political choices.

The third is systems theory. Early warning is not a single activity performed by a single organisation. It is a chain involving data providers, analysts, communities, civil society, government agencies, traditional authorities, security institutions, humanitarian organisations and decision-makers. A weakness at any point can undermine the whole system. Excellent satellite data cannot prevent violence if nobody interprets it correctly, if decision-makers receive it too late, or if institutions lack the resources or authority to respond.

Taken together, these perspectives support a people-centred approach. They avoid two extremes: the belief that technology can solve conflict on its own, and the assumption that surveillance-related technologies can only produce coercion. The more useful position is that technology can widen the information available to peacebuilders, while its actual effects depend on governance, context and human judgment.

The Space Technology–Peacebuilding Nexus (STPN) Model

The Space Technology-Peacebuilding Nexus (STPN) Model is this article's original contribution. It explains how space-derived information can be converted into preventive peace outcomes through five connected stages, summarised in Table 1.

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Table 1 The Five Stages of the STPN Model

STPN Stage	Core Activity	Illustrative Tools	Expected Peacebuilding Value
1. Risk sensing	Detect physical, environmental, mobility, and infrastructure changes associated with heightened vulnerability.	Satellite imagery, meteorological data, GNSS, remote sensing	Broad-area awareness and detection of emerging stressors
2. Contextual interpretation	Combine geospatial indicators with local knowledge, conflict history, and social analysis.	GIS, community reports, conflict-event data, field verification	Reduces false alarms and avoids simplistic interpretations
3. Preventive decision	Translate assessed risks into prioritised, rights-respecting action	Risk dashboards, response protocols, inter-agency coordination	Links warning to timely authority and resources
4. Peacebuilding response	Implement civilian protection, mediation, relief, dialogue, and service-delivery measures.	Satellite communications, logistics mapping, location-based monitoring	Addresses immediate risks and underlying grievances
5. Accountability and learning	Evaluate whether interventions reduced harm and adjust future action	Independent review, data audits, community feedback, outcome mapping	Builds trust, improves accuracy, and limits misuse

The model contains three cross-cutting safeguards:

- Human oversight: analysts and decision-makers must review automated signals and assess uncertainty.
- Community legitimacy: affected communities, local leaders, women's groups, youth groups, and civil society should participate in interpretation and response design.
- Rights-based governance: data collection, sharing, retention, and use must comply with legality, necessity, proportionality, and accountability principles.

For example, satellite data may show dry-season vegetation loss and unusual livestock movement around a farming corridor. This does not establish that violence will occur. Under the STPN Model, the finding is triangulated with local monitors, weather data, market conditions, migration information, and reports of prior disputes. If risk is validated, authorities can convene local mediation, secure agreed transhumance routes, deploy neutral protection for civilians, pre-position water or veterinary support, and monitor outcomes. The desired output is not merely an accurate map; it is a timely reduction in violence and mistrust.

Literature Review

Existing scholarship provides a useful foundation for considering space technology as part of peace and security practice. Remote sensing can reveal physical changes across large or inaccessible areas and has been applied to conflict monitoring, humanitarian assessment, environmental analysis, damage assessment and the documentation of possible violations. At the same time, the literature repeatedly warns that imagery has limits. Resolution, cloud cover, sensor differences, classification error, cost and weak ground-truth information can all affect the reliability of conclusions.

Research on conflict prediction has expanded the discussion. Goodman, BenYishay and Runfola's (2024) Nigeria-focused study combined Landsat 8 imagery with conflict-event data to examine whether satellite-derived features could help predict later conflict-fatality risk. The results suggest that imagery contains useful signals. But predictive performance should not be mistaken for an explanation of conflict. Prediction identifies patterns of heightened risk; peacebuilding requires knowledge of causes and workable responses.

Early-warning scholarship adds another important point: the warning–response gap. Institutions can receive accurate information and still fail to act. Political hesitation, institutional competition, unclear mandates, limited funding and fear of escalating a situation can all delay preventive action. Nigerian civil-society early-warning initiatives illustrate why local observation remains important. WANEP-Nigeria reports a network of community field monitors operating across the states and the Federal Capital Territory and linking community-level information with broader regional prevention arrangements. (West Africa Network for Peacebuilding Nigeria, n.d.)

Nigeria's own space sector provides a further institutional foundation. The National Space Policy and Programmes identify areas including defence and security, communications, remote sensing, natural-resource management and satellite meteorology. NASRDA provides a national institutional base for space research and applications, while the Defence Space Administration has a security-focused mandate. NigeriaSat-X also represents domestic experience in Earth observation. These assets are important, but they do not remove the need for complementary national, regional, commercial and open data sources. (National Space Research and Development Agency, 2010; National Space Research and Development Agency, n.d.)

The institutional picture also points to a coordination problem. Civilian space institutions, military and security bodies, disaster-management organisations, environmental agencies and peacebuilding actors may all hold information relevant to the same event. The challenge is to make those capabilities work together without allowing peacebuilding infrastructure to become indistinguishable from a surveillance system. (Defence Space Administration, 2016; National Space Research and Development Agency, 2010)

The coordination challenge is not merely administrative but statutory, and the two governing Acts do not resolve it. Section 6(k) of the NASRDA Act 2010 designates NASRDA as the repository of all satellite data over Nigeria's territory and requires that all collaboration and consultation on space-data-related matters be carried out by or with the Agency (Federal Republic of Nigeria, 2010). The Defence Space Administration Act 2016, enacted six years later, established the Defence Space Administration as a separate body corporate with its own Directorate of Earth Observation, its own satellite assets, and its own space-intelligence analysis function, without acknowledging section 6(k) of the NASRDA Act or establishing a data-sharing mechanism between the two agencies (Federal Republic of Nigeria, 2016). The only statutory link between them is ministerial cross-representation on each other's governing councils, which functions more as a political safeguard than an operational one.

Faiyetole and Abiodun's (2026) study of Nigerian herder–farmer conflict corridors provides another useful empirical reference. Using Sentinel-2 imagery and geospatial analysis, the study examined climate, land-use and water variables and found that environmental conditions matter in some conflict settings, while socio-political and cultural factors remain important in others. This finding reinforces the central logic of the STPN Model: satellite data can identify conditions of concern, but it cannot provide the complete social explanation of conflict.

A gap therefore remains in the Nigerian literature. Much of the discussion identifies what satellites can observe, but less attention is given to the institutional pathway between observation and peacebuilding. The STPN Model addresses that gap by asking what happens after a satellite detects a change: who verifies it, who interprets it, who decides what to do, what safeguards apply, and how the outcome is assessed.

Research Methodology

This article adopts a qualitative, exploratory and policy-oriented research design. It combines an integrative literature review with doctrinal analysis of relevant Nigerian policy and legal materials. The purpose is not to estimate the causal effect of a particular satellite programme on violence, but to develop a context-sensitive framework for examining how space-derived information could support conflict prevention and peacebuilding in Nigeria.

The sources fall into four broad groups: scholarly literature on remote sensing, conflict monitoring, forecasting and peacebuilding; Nigerian policy and legal documents, including the National Space Policy and Programmes, the NASRDA Act and the Defence Space Administration Act; institutional materials from NASRDA, ECOWAS and Nigerian early-warning initiatives; and applied studies linking satellite imagery and geospatial analysis to conflict risks in Nigeria.

The analysis was organised around five themes: technological applications, conflict-prevention functions, institutional arrangements, legal and ethical risks, and policy implications. The STPN Model emerged from this conceptual synthesis. Findings that repeatedly appeared across the literature were arranged into a sequence connecting sensing, interpretation, decision, response and learning.

The study has clear limits. It does not provide primary field evidence from Nigerian communities and does not test the STPN Model experimentally. It also does not establish that a particular space technology causes a reduction in conflict. The model should therefore be understood as an analytically grounded framework that requires empirical testing through pilot projects, interviews, participatory research and geospatial evaluation in different conflict settings.

Applying the STPN Model to Nigeria's Conflict Dynamics

The usefulness of the STPN Model becomes clearer when it is applied to Nigeria's actual conflicts. Nigeria does not have one conflict with different names. It has multiple conflict systems, each shaped by its own mixture of grievances, incentives, environmental pressures, criminal networks, political relationships and institutional weaknesses. A tool that is valuable in one setting may have little value in another.

The relevant question is therefore not whether satellites can solve Nigeria's security problems. They cannot. The better question is what information space technology can provide at a particular point in a conflict, how that information can improve a decision, and what safeguards are needed before action is taken.

The resulting pathway is best expressed as: Space Technology → Geospatial Intelligence → Risk Identification → Evidence-Based Decision-Making → Preventive Action → Peacebuilding Outcomes. The important work occurs between the arrows. Technology produces information; institutions and communities determine what that information means and what should be done with it.

Understanding Conflict Through a Spatial Lens

Geography matters across Nigeria's conflict environment. The location of roads, forests, water sources, settlements, agricultural land, grazing areas, borders, mining sites and displaced populations can affect how insecurity develops and spreads. Earth observation can provide repeated views of these spaces, while GIS can combine imagery with demographic, environmental and administrative information.

The 2026 research by Ayodele A. Faiyetole & Winner O. Abiodun on herder–farmer conflict corridors illustrates both the promise and the limits of this approach. Climate and land-use variables can help identify places where pressure is increasing. Yet the same environmental conditions may produce different outcomes in different communities because local institutions, political relationships and perceptions of fairness differ. Space technology should therefore support conflict analysis rather than replace it.

Farmer–Herder Conflict: From Resource Monitoring to Early Warning

Farmer–herder conflict is a particularly useful setting for applying the STPN Model because land, water, vegetation and mobility are all spatially observable. Environmental change, population pressure, insecurity and changing pastoral routes can increase competition over resources. Satellite imagery can help identify where these pressures are becoming more pronounced.

Relevant questions include: Where is vegetation declining? Which water sources are becoming less

available? Where is land use changing quickly? Which agricultural and grazing areas are coming into closer contact? Which locations show repeated environmental stress? The answers can be combined with information from communities, agricultural agencies, meteorological services, traditional authorities and security institutions.

The purpose should not be to label a location as a future conflict zone. A more responsible approach is to identify an area where environmental and social pressures warrant preventive attention. Government could then target water infrastructure, resource-access planning, mediation and community engagement before disputes become violent.

The limitation is equally clear. A satellite can reveal a shrinking water source, but it cannot decide who has a legitimate claim to it. It cannot establish whether a community has been excluded unfairly or whether a longstanding grievance is driving the dispute. Those questions require human inquiry. This is why contextual interpretation is not an optional part of the STPN Model; it is what prevents environmental data from being turned into simplistic explanations of social conflict.

Banditry and Rural Insecurity

Banditry presents a different problem. Large rural areas in parts of northern Nigeria can be difficult to monitor continuously. Terrain, dispersed settlements and insecurity may restrict field access. Wide-area Earth observation can help establish a basic picture of roads, settlements, infrastructure and displacement patterns.

- mapping difficult or inaccessible terrain;
- monitoring changes around settlements;
- identifying damaged infrastructure;
- supporting route and accessibility analysis;
- mapping displacement and humanitarian pressure; and
- providing geographical information for planning relief and recovery.

These uses should not be confused with human intelligence. Satellite imagery may show a road, settlement or change in land cover without reliably revealing the identity or intention of the people involved. An unusual pattern can also have an innocent explanation. Treating imagery as conclusive intelligence can therefore produce unnecessary action and damage trust.

The key policy trade-off is between speed and certainty. Space-based information can be obtained over wide areas and can support rapid situational awareness. But decisions with serious consequences for people should be based on corroborated information and clear confidence levels rather than on a single image or automated alert.

Terrorism and Insurgency: Security Without Technological Overreach

Insurgency and terrorism create the strongest temptation to treat space technology primarily as a surveillance capability. Earth observation, satellite communications, navigation and geospatial analysis can certainly support security operations and humanitarian planning. They can help authorities understand terrain, assess damage and plan access to affected communities.

Nigeria's policy direction already recognises security-related applications of satellite technology, including border monitoring and the monitoring of conflict-affected areas. The challenge is to ensure that a peacebuilding agenda does not disappear once security applications become the dominant priority.

A wider ability to observe territory brings corresponding responsibilities. Rules should govern who may access sensitive information, why it may be used, how long it may be retained, how it may be shared and who can review its use. Civilian protection, accountability and purpose limitation should remain part of the architecture.

The choice is not simply security versus privacy. A more defensible choice is between unregulated surveillance and lawful, proportionate and accountable use of geospatial intelligence. Security objectives are more likely to retain public legitimacy when the institutions pursuing them are subject to clear rules and oversight.

Illegal Mining and Resource Conflicts

Illegal mining provides another example of how space technology can serve both environmental governance and conflict prevention. Mining can change landscapes, affect water sources and place additional pressure on land used for farming. In some areas, it may also overlap with criminal networks and disputes over control of natural resources.

Satellite imagery can reveal changes in land cover over time and help identify areas requiring investigation. When such information is connected to environmental agencies, local authorities and community reports, it can support earlier intervention. The goal is not merely to identify illegal activity, but to prevent environmental damage from becoming another source of livelihood conflict.

The same caution applies here: imagery should be evidence for investigation, not automatic proof of wrongdoing. Ground verification, legal procedures and institutional review remain necessary. The relevant trade-off is between efficient detection and procedural fairness.

Climate Change, Displacement and Resource-Based Conflict

Climate pressures are increasingly relevant to peacebuilding because environmental shocks can affect livelihoods and mobility. Flooding, drought, desertification, erosion and changing agricultural conditions can disrupt communities and push people to move. Where displaced populations arrive in areas already under pressure, competition over land, water, housing and services can increase.

This is where the human-security foundation of the STPN Model is particularly useful. Satellite meteorology and Earth observation can identify vulnerable areas before a crisis reaches its worst point. Such information can support flood preparedness, water planning, agricultural assistance, rangeland management and humanitarian logistics.

The peacebuilding opportunity lies in connecting these activities rather than treating them as separate policy fields. A community experiencing environmental stress, livelihood vulnerability, population movement and weak infrastructure may require preventive attention even when no violent incident has yet occurred. The technology does not predict that conflict will happen. It helps identify conditions under which prevention may be more valuable.

This distinction matters because climate change should not be treated as an automatic cause of conflict. Environmental pressure can create opportunities for dispute, but institutions, governance and social relationships influence whether those pressures become violent. The STPN Model therefore uses environmental information as an early-warning input, not as a deterministic explanation.

Communal Conflicts and the Importance of Local Knowledge

Communal conflicts show most clearly why satellite information cannot stand alone. Imagery can show settlement expansion, land-use changes, vegetation loss and physical damage. It cannot adequately capture historical grievances, traditional relationships, political manipulation, perceptions of injustice, communal narratives or the legitimacy people attach to competing claims.

The STPN Model therefore rests on a multi-source principle: satellite data should be combined with community information, administrative records, relevant security intelligence and conflict analysis before a preventive decision is made. This is not a weakness of technology. It recognises what technology can and cannot observe.

The central trade-off here is between scale and context. Satellites provide scale. Communities provide context. A peacebuilding system that has only one of these will be incomplete.

Risk-Based Governance and Defensible Policy Trade-Offs

The preceding analysis suggests that Nigeria's space-policy conversation should move beyond how many satellites can be acquired. A more important question is how the resulting information will be governed. Four risks are particularly important: misinterpretation of data, threats to privacy and civil

liberties, institutional fragmentation, and unequal technological capacity.

Satellite information is powerful but imperfect. Cloud cover, resolution, sensor characteristics, incomplete historical data and analytical error can all affect conclusions. At the same time, the ability to monitor places and movement raises legitimate questions about privacy, surveillance and the protection of vulnerable communities. These concerns become more serious where sensitive information is shared widely or used for purposes different from those for which it was collected.

Institutional fragmentation creates another problem. Several agencies may possess pieces of the same picture without a shared process for combining them. Conversely, placing too much information and authority in one institution may create its own accountability problem. Nigeria therefore needs coordination without uncontrolled concentration of power.

There is also a capacity question. Space-based systems require analysts, infrastructure, software, secure data environments and sustained training. Dependence on external imagery and processing services may sometimes be practical, but excessive dependence can create concerns about continuity, sovereignty, cost and access.

Defensible Policy Choices

The central policy challenge is to maximise the peacebuilding benefits of space technology while controlling the risks associated with its use, as summarised in Table 2.

Table 2 Policy Trade-Offs in the Use of Space Technology for Peacebuilding

Policy Choice	Potential Benefit	Potential Risk	Defensible Approach
Wider satellite surveillance	Better situational awareness	Privacy and misuse	Establish lawful access, oversight, and purpose limitation
Rapid intelligence sharing	Faster response	Misinterpretation or leakage	Use graded confidence levels and verification
Centralised data management	Better coordination	Institutional over-concentration	Shared governance with defined access rights
Open access to some geospatial data	Greater research and public benefit	Security concerns	Classify data according to sensitivity
Greater investment in indigenous satellites	National resilience and autonomy	High cost	Prioritise mission-specific capabilities
AI-assisted satellite analysis	Faster processing	Algorithmic error and bias	Require human validation for consequential decisions
Security-focused applications	Improved counter-insurgency capability	Militarisation of civilian space assets	Maintain clear civilian-security governance boundaries
International data partnerships	Access to advanced technology	External dependency	Build domestic capacity alongside partnerships

This approach allows the article to move beyond the simple claim that space technology is beneficial. The more credible position is that space technology creates opportunities whose value depends on how carefully those opportunities are governed.

Towards an Integrated Nigerian Space-Enabled Peacebuilding Architecture

Nigeria does not necessarily need another institution to make space technology relevant to peacebuilding. It may gain more by connecting capabilities that already exist. NASRDA's mandate includes coordinating space applications, developing relevant

technologies, establishing information networks, collaborating with national and international institutions and serving as a repository of satellite data relating to Nigeria.

The practical opportunity is to create stronger links between space-derived information and institutions responsible for conflict prevention, environmental management, humanitarian response, disaster risk reduction, agriculture, natural-resource management and national security. The African Union's Outer Space Strategy also provides a continental context in which remote sensing, disaster management, climate forecasting, development and security can be connected.

A Nigerian space-enabled peacebuilding architecture could be organised around five operating principles. First, detect early: use Earth observation and related data to identify indicators of vulnerability. Second, verify locally: test satellite observations against community and institutional information. Third, respond proportionately: match the response to the nature and reliability of the risk. Fourth, protect rights: ensure that data use remains lawful, necessary and accountable. Fifth, learn continuously: use evaluation and feedback to improve the system.

The pathway can therefore be restated as: Space Technology → Information → Analysis → Institutional Decision → Preventive Action → Peacebuilding Outcome. The most important part of the chain is not the satellite. It is the institutional space between information and action. That is where interpretation, judgment, legitimacy and accountability determine whether technology contributes to peace.

Measuring Whether Space Technology Contributes to Peace

A serious peacebuilding strategy needs measures of success. The number of satellites launched, images processed or maps produced may demonstrate technological activity, but they do not demonstrate that violence has been prevented or that communities are safer.

More meaningful measures would include reductions in response time, improvements in early-warning accuracy, the number of credible risks identified before escalation, better targeting of humanitarian resources, reductions in avoidable environmental disputes, improved inter-agency coordination, wider access to reliable geospatial information and evidence of stronger community resilience.

These indicators shift attention from technological outputs to human outcomes. They also create a basis for deciding whether a particular space-enabled programme is worth expanding. A technically impressive system that does not improve decisions, reduce harm or strengthen trust should not be treated as a successful peacebuilding intervention.

Challenges

Several challenges could limit the implementation of the STPN Model in Nigeria. Institutional fragmentation may leave agencies with overlapping responsibilities but no common operating procedures. Early-warning systems may generate information without triggering action because funds, political incentives or pre-agreed responses are missing. Data quality may also be affected by cloud cover, resolution limits, incomplete records, algorithmic bias and inadequate ground verification.

Human capacity is another concern. Effective peacebuilding applications require people who understand remote sensing and GIS, but also conflict analysis, humanitarian protection, statistics, data ethics and local social conditions. A shortage in any of these areas can weaken the quality of the final assessment.

Cost and external dependence must also be considered. High-resolution commercial imagery, specialised software, secure communications and cloud processing can be expensive. Partnerships can help Nigeria access capabilities it does not yet possess, but those partnerships should be accompanied by domestic investment in skills, infrastructure and institutional memory.

Privacy and human rights concerns cannot be treated as secondary issues. Geospatial information can

expose displaced populations, activists, communities or suspected actors to harm when it is shared irresponsibly. The fact that information can technically be obtained does not mean that it should automatically be collected, retained or disclosed.

There is also a risk that civilian space capabilities become associated with coercive surveillance. If communities believe that participation in a data system may expose them to punishment, they may stop providing information. That would weaken the very early-warning system the technology was intended to strengthen. Digital inequality can produce a similar problem when the communities most affected by violence have the least influence over how information about them is interpreted.

Finally, risk maps can be politically manipulated. A classification of an area as high-risk may influence security decisions, resource allocation or public narratives. Transparent methodologies, confidence ratings, independent review and clear accountability are therefore necessary if geospatial intelligence is to retain public legitimacy.

Policy Recommendations

Nigeria should pursue a phased strategy that treats space technology as part of a wider prevention system rather than as a stand-alone security project.

1. Establish a National Geospatial Peace and Early-Warning Hub

A civilian-led coordination hub should connect NASRDA with peacebuilding institutions, disaster-management bodies, relevant security agencies, state governments, universities, civil society and ECOWAS mechanisms. Its task should be to combine satellite-derived indicators with verified community reporting and produce practical, action-oriented assessments rather than simply circulating raw data. This could be achieved through subsidiary legislation or an inter-agency memorandum of understanding.

2. Adopt a Complementary Space-Data Governance Framework

Nigeria should establish clear rules for data access, classification, retention, sharing, anonymisation, audit trails and redress. The framework should reflect legality, necessity, proportionality, purpose limitation and independent oversight. Sensitive geospatial information should not be treated as unrestricted simply because it is technically available.

3. Institutionalise the STPN Response Chain

Each major risk category should have a pre-agreed response protocol. Flood and displacement indicators could trigger humanitarian and access planning. Farmer–herder risk indicators could prompt mediation and resource-access interventions. Credible warnings concerning attacks on settlements could trigger civilian-protection assessments and humanitarian alerts. The exact response should depend on the reliability and nature of the warning.

4. Prioritise Data Fusion, Not Satellite Acquisition Alone

Investment should extend beyond the acquisition of new satellites. Nigeria also needs skilled analysts, interoperable databases, secure processing environments, open-source imagery capability, field-verification systems and decision-support tools. Domestic Earth-observation experience is valuable, but its peacebuilding value depends on how effectively it is connected to other sources and to institutions capable of acting.

5. Build Subnational and Community Capacity

State and local peacebuilding structures, traditional institutions, civil-society monitors, women's peace networks and youth organisations should have access to training on interpreting risk products, validating alerts, protecting sensitive information and communicating local priorities. Community participation should be treated as part of the information system, not as an afterthought.

6. Create Independent Validation and Public-Interest Safeguards

A multi-stakeholder oversight mechanism should review sensitive uses of geospatial intelligence, assess possible discrimination or harm and provide periodic transparency reporting where disclosure would not compromise legitimate security and data privacy/protection. Independent review can also improve confidence in the system.

7. Link Space Technology to Climate-Security Planning

Satellite meteorology and Earth observation should support water management, rangeland restoration, flood preparedness, livelihood assistance and land-use planning in vulnerable areas. This would connect technological monitoring with structural prevention rather than waiting for environmental pressures to become violent disputes.

8. Strengthen Regional Interoperability

Nigeria should align relevant national systems with ECOWAS early-warning arrangements. Cross-border analysis is particularly useful where insecurity involves pastoral mobility, trafficking, transnational armed groups or climate-related displacement. Shared standards can also reduce duplication and improve continuity of information across borders.

9. Support Research and Pilot Evaluation

The STPN Model should be tested in contrasting environments rather than assumed to work equally well everywhere. Suitable pilots could include flood-prone communities, farmer–herder corridors, areas affected by banditry and locations undergoing post-insurgency recovery. Evaluation should examine predictive performance, response time, civilian protection, community trust and actual conflict outcomes.

Conclusion

Space technology can make a meaningful contribution to peacebuilding and conflict prevention in Nigeria, but its value depends on how it is governed and used. Earth observation, satellite communications, navigation services, meteorological information and geospatial analysis can improve understanding of environmental stress, displacement, infrastructure damage, mobility and other conditions relevant to insecurity. Nigeria already has important policy and institutional foundations from which to build.

The central challenge is therefore not simply whether Nigeria possesses satellites or access to satellite data. It is whether information can be converted into timely, legitimate and locally appropriate action. The STPN Model addresses this challenge by placing space-derived information within a five-stage cycle of risk sensing, contextual interpretation, preventive decision, peacebuilding response, and accountability and learning.

The model also makes an important normative point. Technology should not displace politics, law or community participation. A satellite cannot mediate a land dispute. An image cannot decide whether a community has been treated fairly. A risk map cannot substitute for trust. What technology can do is help people and institutions see certain changes earlier, understand their geographical dimensions and make better-informed decisions.

For Nigeria, the most defensible path is therefore an integrated geospatial peace infrastructure. Such an infrastructure would combine technical capability with legal safeguards, human expertise, community participation, local ownership and political accountability. It would judge success by fewer preventable harms and better decisions, not by the number of technological assets acquired.

Used in this way, space technology becomes neither a miracle solution nor merely a surveillance instrument. It becomes one part of a broader peacebuilding system: a means of seeing risk earlier, testing assumptions more carefully, directing preventive resources more intelligently and learning from what happens next. That is the practical promise of the STPN Model for Nigeria.

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