Moving forward the EU-India Security Dialogue

Traditional and emerging issues

Potential and challenges of India-EU space cooperation

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Traditional and emerging issues

Gateway House: Indian Council on Global Relations, Mumbai,
in partnership with
Istituto Affari Internazionali, Rome

Potential and challenges of India-EU space cooperation

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Commentary- Potential and challenges of India-EU space cooperation

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List of abbreviations

- ESA - European Space Agency
- EUSatCen- EU Satellite Centre
- GSA- European Global Navigation Satellite Systems Agency
- ICoC- International Code of Conduct for Outer Space Activities
- IGY- International Geophysical Year
- NASA- National Aeronautics and Space Administration
- NAVIC- Navigation with Indian Constellation
- NEO- near-Earth objects
- UNSC- United Nations Security Council

Commentary- Potential and challenges of India-EU space cooperation

1. Introduction

India is advancing its civilian space programme at a faster pace than ever before. This is evident in several such milestones as the actualisation of the Chandrayaan-1 (2008) and the Mars Orbiter-1(2013) missions, the initial successes with the Reusable Launch Vehicle, the newly acquired heavy-lift capability with the GSLV Mark III (2014), the operationalisation of Navigation with Indian Constellation (NAVIC) (2016), and the ongoing commercial successes with the Polar Satellite Launch Vehicle.

New Delhi is a responsible space power that has grown from a modest colonial past. Since Independence, one of the foundational values of India's long diplomatic and cultural partnerships with most nations of the world has been the exchange of scientific knowledge. Such interactions make diplomatic relations more durable as compared to mere transactional and protocol-based exchanges.

Building on this value, India has cultivated strong bilateral and multilateral cooperation with several major space agencies—in the United States, Russia, France, Germany, Italy, Canada, and Japan. The country also provides satellite and rocket launch services to the developing world.

The coming together of India and EU's space programmes has immense civilian-strategic implications. However, space security, a crucial area of concern, has never been on the primary agenda between India and the EU. As a geopolitically sensitive issue though, it demands greater and nuanced interaction.

The paper titled 'Moving forward the EU-India Security Dialogue Traditional and Emerging Issues: EU-India Cooperation on Space Security' by Isabelle Sourbès-Verger for the Istituto Affari Internazionali, Rome, initiates a dialogue on this necessary interaction.

It raises several important points, as listed below, followed by this author's observations and commentaries.

2. India and Europe's cooperation-driven space programme

The paper emphasises cooperation as the foundation for developing an intra-European framework of the national space programmes of the European Union (EU) member states, and for the evolution of the intergovernmental European Space Agency (ESA). It recommends this cooperative mechanism as a model for the India-EU space partnership in future.

Comment

The Indian scientific establishment of the 20th century was contemporaneous with the advanced countries of the world in its aspirations to pursue cutting-edge Earth and space

exploration. Even during colonial rule, the country's scientists had already demonstrated exemplary proof-of-competence in this field. They collaborated internationally, operated a few, but top class, scientific institutions, won prestigious global accolades, and participated in or presided over international science coalitions.

At the same time, the establishment was aware that there was a wide technology gap between India and the then advanced nations of the world in crucial areas such as steel and metallurgy, mass manufacturing, automation, agriculture, health, transportation, precision instrumentation, communications, and power-generation. To rapidly minimise this gap, created by centuries of colonialism and arrested economic growth, India began to vigorously pursue science diplomacy.

India nurtured its science and technology partnerships with other nations through the International Geophysical Year (IGY, 1957-58). Conceptualised in 1950, the IGY was the largest multilateral scientific engagement of its kind after World War II. India's scientific establishment, despite the varying tugs of alignment by the Soviet Union and the United States, was largely able to maintain its middle-ground and cooperate fairly and independently with all geopolitical and geoeconomic blocs.

At the present juncture, New Delhi perceives the EU as a remarkably cooperative region teeming with diverse member state-run space agencies, intergovernmental space agencies, and private space contractors all evolving synchronously. It has long-running space cooperation with many European Union member states, especially France and Germany.

India would be interested in forging space cooperation with the EU in areas of common interest.

3. India's cooperation on the Galileo programme

The paper points out the absence of progress on the (so-far) only potential space cooperation between India and EU—the Galileo navigation programme.

Comment

The EU, in Part I, Article 4 of the 2007 *Treaty on the Functioning of the European Union,* agreed to R&D of outer space as a shared competence between member states and the Union. Even so, the EU, in its *Global Strategy for the European Union's Foreign and Security Policy* (June 2016) has resolved to develop autonomy in space, security of its space-based services, and promotion of responsible space behaviour.

The executive wing of the EU, in partnership with private companies, is therefore reportedly creating nucleating centres for R&D in the space sector, such as the European Global Navigation Satellite Systems Agency (GSA) based in Prague, Czech Republic, and the EU Satellite Centre (EUSatCen) based in Torrejón de Ardoz, Spain. All this indicates the EU's intent to establish an autonomous network- and security-centric space programme.

The dual-purpose Galileo navigation programme is progressing at an intermittent pace and it will take a while to establish the entire satellite constellation. Unlike civilian and commercial programmes, which often have a smooth progression, dual-purpose programmes are known to face geopolitical interference. If a non-nation sovereign unit like the EU intends to develop dual-purpose technological programmes like Galileo at a pace that serves its interests, it needs to follow two key aspects: indigenous competence and a limited number of confidantes.

So far though, India and the EU have not made any progress on their tentative cooperation on the Galileo programme. This is rooted in a context, as outlined below:

India is a peaceful democratic nation flanked by a volatile neighbourhood, including a state with nuclear weapons that promotes cross-border terrorism as a form of hybrid warfare. Additionally, India has a no-first-use policy. In this context, India faces specific vulnerabilities. It can be conjectured that as India increasingly began to suffer from external state-sponsored terrorism, since 1990s, its security forces must have plausibly felt the acute need for a vital satellite positioning/navigation data to keep a check on terrorist infrastructure. This external threat to national security and the compelling data deficiency brought to India's notice the stark necessity to develop indigenous competence in navigation/positioning systems.

In case of a war, India cannot afford to depend on any foreign positioning/navigation systems or be part of a delayed international navigation system project like Galileo. India therefore rapidly developed its NAVIC, which was operationalised in 2016 within a span of three years.[1] NAVIC serves India's security requirements, allowing it, when necessary, to neutralise conventional security threats; it helps the country to maintaining its national interests in a multipolar world.

4. On EU's diplomatic measures for addressing space security challenges

The paper discusses the EU's well-meaning attempt to promote its legally non-binding draft International Code of Conduct for Outer Space Activities (ICoC), which is aimed at a global effort on space security. The author speaks of the possibility of the EU and India jointly writing a new ICoC-like proposal.

Comment

There will never be a lack of well-meaning diplomatic mechanisms for encouraging global peace and security, but there is always a dearth of the one mechanism that will completely realise this goal. True to this fact, in the past 16 years, several diplomatic mechanisms have been proposed. These include the EU-led ICoC, the Transparency and Confidence Building Mechanisms in Outer Space Activities by the United Nations Office of Disarmament Affairs, and the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects jointly proposed by China and Russia.

The paper gives examples of geopolitical blocs opposing each other's diplomatic mechanisms. These oppositions establish three facts:

1. Those who draft space security agreements often deliberately overlook their own capability to inflict damage, and by doing so try to gain and maintain their own astrogeopolitical advantage.

2. They also often introduce clauses within agreements that are inimical to the interests of other nations.

3. Treaties and agreements are evolving much slower than the pace at which cutting-edge space capabilities (civilian, commercial, and military) are evolving.

Peace in space will prevail when the interests and abilities of all space-faring nations are in equilibrium. And this can only happen if crucial international bodies are democratised, especially considering the changing counters of geopolitical multipolarity.

If the revised version of the ICoC and its controls and checks were to apply globally, the ICoC will have to be apolitical, able to forecast futuristic threats, possess the most stringent and state-of-the-art control mechanisms, and ensure balanced participation by great powers, regional powers, and economically weaker states.

India's permanent membership in the United Nations Security Council (UNSC) would be a crucial factor in the success of any space security draft it writes or co-writes. Therefore, democratising the UNSC is imperative if the stagnancy in outer space reforms movement is to be addressed.

5. Why India-EU space cooperation is nascent?

The paper examines the reasons for the very limited India-EU space cooperation involving dual-purpose technologies and recommends possible areas for heightening the engagement.

Comment

Space cooperation between India and the EU space is still nascent when compared to the cooperation between India-France or India-Germany. This is largely due to the EU's limited autonomy over its tentative space programme. The EU is a large monetary contributor to the trans-governmental ESA. It runs its only two programmes with the ESA—Copernicus and Galileo. With such heavy dependency on the ESA, which is not an entirely EU agency, India views the EU as a promoter and facilitator of a tentative network- and security-centric dual-purpose space programme, rather than as a sovereign unit possessing a total autonomy over the programme.

The paper also refers to the EU's dependency on the U.S. for the transfer of dual-purpose technologies to India. At a time when India is interested in enhancing its indigenous capabilities, it will seek the transfer of only those dual-purpose technologies that it really lacks in and not those technologies that the provider itself is struggling to progress. All these factors have not helped EU-India cooperation.

It is evident from the roadmap charted in the EU-India Agenda for Action 2020 that the relations between the two sides are based on non-military common interests. In the same roadmap, space cooperation comes within the focus area of 'research and innovation' and not under 'security'.

Therefore if a strong EU-India space partnership is to be forged, the path of space science research and space technology innovation will yield greater success than the path of military (dual-purpose technologies) partnerships. India-EU cooperation will be fruitful if it is not merely a vendor- purchaser exchange but a bilateral process between equal partners.

6. The scope of India-EU cooperation in monitoring space

The paper recognises that monitoring of space, also known as space situational awareness, is a crucial issue for all the major space powers of the world, including India and the EU. The authors view this surveillance as a technical as well as political issue.

Comment

Most space policy experts from across the world separate space security challenges into natural threats (space weather effects, meteorites) and anthropogenic threats (space-based weapons, surface-to-space weapons, runaway satellite debris scenarios). Most of these experts are in diplomacy-related think tanks, so they focus more on anthropogenic threats, which become the subject of perpetual diplomatic and political discussions. In this process, natural threats are underestimated. But this does not serve the comprehensive purpose of space security—or security from threats originating in space.

Celestial objects—the kilometre-sized asteroids, comets and their meter-sized fragments (meteorites, bolides)—that have the potential to cross the Earth's orbit and collide onto it—pose the highest form of hazard to life on Earth. Geological records testify that celestial objects were the cause of several life extinction events during the entire history of the Earth. Unfortunately, the world today does not have the necessary global infrastructure to mitigate this omnipresent but stealthy threat.

A recent sky survey done by the National Aeronautics and Space Administration suggests that more than 15,000 near-Earth objects (NEO) revolve close to the Earth, of which approximately 400 objects are deemed to be potentially hazardous.[2] The Earth annually receives an estimated 40,000 tons of non-hazardous microscopic extra-terrestrial material and an estimated 50 tons of meter-scale meteoritic material.[3] [4] A considerable number of meter-scale objects enter the Earth's atmosphere and detonate with energies ranging up to a hundred mega tons of TNT.[5] Often such explosions occur over desolate swathes of land and oceans and hence go unnoticed.

But the meter-sized meteor that fell in 2013 over the city of Chelyabinsk in Russia exploded in the atmosphere with an intensity several orders of magnitude higher than the 1945 nuclear

explosions.[6] The disaster damaged infrastructure worth billions of dollars and caused thousands of casualties.

Europe and the Indian subcontinent are both densely populated and have extensive rural and urban infrastructure. As a result, their geographical expanses are highly vulnerable to any falling celestial impactor. If a meter-sized meteor impact or an atmospheric meteor explosion were to occur over such densely populated regions of the world, it could cause terrible multi-dimensional and cascading consequences (mortalities, infrastructure, economic, social, and political).

Space situational awareness is already on the agendas of India and the EU. The Indian Space Research Organisation has expressed its intent to launch an asteroid exploration mission, possibly in the decade of 2020s.[7] The ESA and the American, German, and French space agencies have also received a proposal from a consortium of EU and American scientists for an Asteroid Impact and Deflection Assessment mission during the same time frame. Along the same lines, India and the EU can jointly develop ground-based NEO surveillance infrastructure within their territories. Sharing and pooling technical, scientific, human and monetary resources, will yield highly favourable results.

The EU-India Agenda for Action-2020 has already listed "enhanced cooperation for joint scientific payloads" as one of the areas of cooperation.[8] Space missions like Rosetta and Chandrayaan-1 have demonstrated the enormous scientific discoveries that payloads are able to spin-off. (A space payload could be any scientifically valuable analytical instrument that carries out measurements of physical phenomena in space or transports passengers in space. In this context, a payload is an analytical precision instrument monitoring and analysing targeted local samples or scanning a physical matter remotely.) The agenda to co-develop scientific payloads for space exploration not only aids research and innovation but also precision manufacturing, trade, and skilled employment.

India and the EU's member states have a strong history of sharing scientific payloads, including the German-led SIR-2 and the Bulgarian RADOM instruments on the Indian Chandrayaan-1 mission (2008), the Indo-French Megha-Tropiques (2011) and SARAL-ALTIKA (2013) missions, and the French-contributed sodium vapour instrument to India's first-ever rocket launch at Thumba (1963). With robust rocket-launch infrastructures and technical expertise on both sides and a rich heritage of payload cooperation, India and the EU are favourably positioned to carry out joint NEO missions.

7. Concluding remarks

Astrogeopolitics is an inevitable successor to geopolitics. It therefore demands similar confidence-building measures as geopolitics—including regular bilateral and multi-lateral multi-track dialogues, joint-space gaming, techno-economic partnerships, and scientific cooperation.

Space security has several dimensions:

1. Security of space-based assets from Earth-based anthropogenic threats
2. Security of space-based assets from another space-based anthropogenic threat
3. Security of space-based assets from natural threats originating from outer space, and
4. Security of Earth from natural threats originating from outer space

The dialogue on space security should therefore not be constricted to merely anthropogenic threats but also include the more frequent and proven hazardous natural threats originating in space.

India-EU space cooperation, even for security issues, would be better served by the path of research and innovation and not through the geopolitically-sensitive dual-purpose technologies. Far greater value and attention must be given to space payloads in diplomatic interactions on space cooperation and space security.

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