



Centre for Air Power Studies (CAPS)

Forum for National Security Studies (FNSS)

Conference Report

6th "Jumbo" Majumdar International Conference

Geopolitics and Aerospace Power

February 3-4, 2015

Inaugural Session

February 3, 2015

Air Marshal Vinod Patney, the Director General of Centre for Air Power Studies, inaugurated the 6th Jumbo Majumdar Conference organised by the Centre to commemorate the IAF icon and hero Wing Commander Jumbo Majumdar. In his inaugural speech, the Air Marshal listed various issues which are of security concern like counter-insurgency, problems of drugs from Afghanistan, problems with Pakistan to name a few. Hence, the conference was an effort to highlight these issues in detail along with discussing other challenges pertaining to space and aerospace power.

The Director General then invited **Air Chief Marshal NC Suri, Former Chief of the Air Staff, India Air Force**, to deliver the keynote address. Air Chief Marshal Suri pointed out the relevance of civil-military connections as people joining the military could hail from a pure civilian background. Armed forces personnel are nationalists and the last bastion protecting democracy. However, he noted how armed-forces had enjoyed greater respect immediately after independence than what they do today. Further, he highlighted that the last two decades have witnessed a number of changes and there is also a reduction in the feeling of national pride. The relevance of civil society for the armed forces is that the civil society is an orchard for the armed forces from where new



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entrants come. There is a need to not just ponder on the external threats, but also on the internal threats. A society which is losing its moral values would affect the intake into the armed forces.

However, notwithstanding the ills, India is a vibrant democracy. Further, he elaborated on how the armed-forces have always been apolitical and hence, would continue to serve the government in power with equal loyalty to ensure that the threats are addressed.

Air Marshal SS Soman, AOC-in-C, Head Quarters Western Air Command, while commemorating Wing Commander Jumbo Majumdar and his pioneering contribution to the Indian Air Force, laid stress on the relevance of air-power in geopolitics and its contributions to hard and soft power tools of a state. The relevance of aerospace power cannot be contested since earth comprises 30% of land and 70% of water, while aerospace is 100%. Aerospace reduces the imposition of geography as has been evident in many operations.

He pointed out that the present multi-polar world has led to insecurity and therefore, there is a need for flexibility to adapt and also a need for responsiveness. However, influence of aerospace on geopolitics is not just restricted to states but also to non-state actors, if one recalls the 9/11 incident. The role of aerospace power is also relevant in regime change, as seen in Libya. The Air Marshal also highlighted the relevance of air-policing as seen in Africa.

The AOC-in-C said that air-power is a preferred and fastest tool for coercion. It is a preferred tool for both compellence (offensive mode) and for deterrence (defensive mode). The relevance of air-power in information gathering of capability of adversaries is invaluable. However, while delving on the application of air-power in military activities, the speaker did not forget to delve on the issue of air-power for soft power and diplomacy and also on the commercial application of air-power. The relevance of air power in humanitarian relief was clearly evidenced with the case study of Operation Megh Rahat and the airlift to Male, he added. He, therefore, asserted that air power remains a capable,



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credible and cost effective solution to meet geopolitical challenges. With respect to India, given the security challenges, the imperative to develop both soft and hard power exists and this is where he believes that air-power could play a significant role in satisfying both the ends. However, if air-power is to become a preferred option for such tasks, there is a need for research and development for air-power to remain a credible option. Mantras of 'Make-in-India' and 'digital-India' are, therefore, of relevance and geotechnical capability should be a counterweight to geopolitical challenges.

India in the Multipolar World: Exploiting Defence and Diplomacy

Session I, February 3, 2015

This session, with **Shri Kanwal Sibal, former Foreign Secretary** as the Chair, emphasized on the inherent dichotomy in India's foreign relations with Russia and with the United States. While Russia has been a vital partner for India and facilitated our defence capabilities, the United States has had a history of sanctions and technology denial. This has been more of an obstacle in building up of India's technologies. Obama's visit to India is a positive start to a greater partnership, but has not generated any concrete agreements. Even the Defence Technology & Trade Initiative (DTTI) faces hurdles as US have strong clauses for end-use monitoring. It has also made signing of some foundation agreements by India mandatory for wider technology transfers. However, the relationship with the US is more wide-ranging in nature and covers a whole gamut of areas. Also, it cannot be denied that the US has the most advanced weaponry. Therefore, there is a wider agreement in India that it is in her interests to diversify her defence partners and pursue a stronger relationship with the US. Further, with the growing emphasis being on economic growth, the Chair reiterated the importance of maritime security in which the US and not Russia will play a significant role.

The first speaker of the session, **Mr. Shakti Sinha**, spoke on India's regional priorities and concerns post-2014. Some of the salient points raised by him were:



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- India prefers to use the term “polycentricism” than “multi-polarity” to refer to changing world order. While the term multi-polarity accounts for the diffusion of political power that extends beyond uni-polarity or bipolarity, polycentricism is a more viable term to cover great power interactions and their multiple interconnections in a complex-globalised world.
- The Modi government has shed its “strategic ambiguity” with the *US-India Joint Strategic Vision Statement for the Asia-Pacific and Indian Ocean Region*. The Joint Statement is more far ranging than the *1970 Indo-Soviet Treaty of Friendship and Cooperation*. The document, for the first time, also emphatically lists the South China Sea as a strategic priority for India.
- While India’s concerns in the region may be numerous, its priority is only one - ensuring stability and prosperity in India’s neighbourhood that adds to (and not distracts from) its goal of economic growth.
- On the issue of Afghanistan, India’s focus should be on ensuring economic growth, institution building and goodwill in Afghanistan rather than aiming for an overtly pro-India Afghanistan; this would automatically bring windfalls for India.
- China has been free-riding in Afghanistan, but with the impending U.S. and North Atlantic Treaty Organisation (NATO) withdrawal, China seems to be investing more effort in the region. Beijing has even appointed a special envoy to the Af-Pak region. In fact, Af-Pak could be a significant point of convergence of interests for India, U.S. and China.

The second speaker, **Ambassador Meera Shankar, former ambassador of India to the US**, delved on Indo-US Defence Relations in the emerging world order. Some of her major observations were:

- Increasing global profile of India and security challenges in its neighbourhood make India’s existing defence capabilities a matter of supreme priority.



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- It is not a matter of pride that India is the largest importer of defence products, as unlike other great powers that possess significant defence capabilities, India lacks a large indigenous defence base.
- There has been strong emphasis on diversification of defence suppliers to optimize India's options in terms of access to technology and pricing of technology transfers to develop domestic technology potential. Various steps have been taken which include opening India's defence sector to private players and inviting Foreign Direct Investment (FDI) by increasing the FDI ceiling in defence industry.
- While numerous issues such as reluctance to licensed production, issue of spares and unreliability of supply during a crisis prevented greater Indo-US ties, the new millennium has seen a significant convergence of US-India interests. There is strong agreement to deter unilateral assertions of power and anchor regional institutions and international norms in the region.
- India and the US have had a Defence Partnership Agreement that has focused on consultations and dialogue since past 10 years. However, the recent DTTI promotes greater defence engagement beyond a supplier-buyer relationship with more emphasis on *Make in India* and stronger *Offset Policies*.

The third speaker, **Ambassador Ajai Malhotra, former Ambassador of India to Russia**, spoke on Indo-Russian Defence Relations in the world order. Some of the salient points conveyed by him are:

- Russia is a significant strategic partner for India and remains so with PM Modi calling Russia a "Pillar of Strength" for India's development, security and International Relations. Ties with each other possess a degree of sensitivity to others' security concerns for both countries and can be expected to only grow in the future.
- India and Russia do not perceive a threat from each other but seek benefits from increased political and economic strengths that each country possesses. Russia may be one of the only few



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countries to enjoy the privilege of regular Annual Summits with India. There have been 15 Annual Summits since 2000.

- India should be wary of the deterioration in US-Russia relations and not let it affect her relations with the primary defence exporter. Standing against Russia in international forums will only push Russia towards China and later may also push Russia closer to Pakistan. Therefore, a strong Russia is in India's long term interests.
- Since revenues from oil & gas finance more than half of Russia's budget, western economic sanctions and decreasing oil prices will affect Russia's economy sharply. However, Russia is also prepared for a \$40/ barrel scenario.
- While China- Russia relations seem to be progressing extremely smoothly, Russia is aware that a too strong China would be an impediment for it and is, therefore, only sharing that technology (with China) for which it has a counter-alternative.

The Chair summed up the session by stating that India's policy of *strategic autonomy* should not be equated with Non-Alignment. Non-Alignment was conceived in a totally different era when India's priorities and concerns were different from what they are today. India has to be careful of not diluting its political relations with Russia in the goal of pursuing greater relations with the United States. The Chair concluded that India must not forget that the US rebalancing to Asia has been largely ineffective in managing the rise of China. In addition to this, in matters pertaining to terrorism, there is also a strong disconnect between India and the US' perception of the Taliban. While the US categorizes the Taliban as an insurgency force, India clearly sees Taliban as a terrorist outfit and an instrument of Pakistan to expand its influence. However, new emerging strategic concepts such as *Indo-Pacific* invite and allow India to play a larger role in the region.



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'Regional Security Dynamics Post - 2014'

Session II, February 3, 2015

In his opening remarks, **the Chair, Shri SK Lambah, Former Envoy of PM on Pakistan and Afghanistan**, spoke about the importance of the year 2014 in context of Afghanistan in which the new President was elected in a new coalition form of government. Some of the challenges that the new government in Afghanistan was likely to face include the challenges of establishing new rules while dealing with an assertive parliament, formulating a joint strategy to deal with the Taliban, among others. Roles and aims of the various countries neighbouring Afghanistan, vis-à-vis their own regional interests, were identified. On Pakistan, the Chair opined that Islamabad would prefer an Afghan government that is subservient, cooperative and/or "under their control." In this regard, he also delved on the concept of strategic depth for Pakistan which he believes is likely to remain pertinent, even if in a less obvious manner and "in the back of the mind". There is a threat of continued Pakistani use of jihadis against India.

On matters pertaining to Iran, the Chair observed the role and function of Iran in Afghanistan as Tehran has, and will continue to have, a determined policy towards Afghanistan owing primarily to two ethno-religious reasons. Firstly, is the presence of a large Balochi population in Iran (2 million, i.e., 25% of the total Balochi population) along with the 500,000 present in Afghanistan. The other reason is the fact that 20% of Afghanistan's total population is Shia. In addition, he also briefly discussed the issue of Iran's interactions with the Afghan Taliban and dubbed it as "revenge against the U.S." on their part.

With regard to China, the Chair highlighted the worries concerning terrorism and an increasing economic profile in Afghanistan. He was of the view that China would play a predominant role in the country in the coming years. Making an additional observation in this context, from an Indian perspective, he felt that any Chinese role in Afghanistan "will side with the Pakistani line of thinking".



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On Russia, the Chair was of the opinion that while there was a lack of a critical and direct threat, there were a few issues of concern including the trafficking of narcotics and the issue of the Chechen rebels' ties with the jihadi elements in Afghanistan. A similar case was made for the neighbouring Central Asian Islamic republics. Finally, talking about the implications for India, the key takeaway was the fact that our vital interests are unlikely to be adversely affected.

The first speaker of this session, **Dr. Shalini Chawla, Senior Fellow, Centre for Air Power Studies**, discussed 'Post – U.S. Withdrawal Impact on Pakistan's Defence Posturing'. The key takeaways include:

- In the wake of heightened cease-fire violations, suspension of dialogue, hardening of positions of both New Delhi & Islamabad and an increased sense of unease within Pakistan owing to the recent progressions in U.S.-India ties, the speaker argues the presence and likely continuation of a three-fold 'Strategic Posture' on the Pakistani side. This posture comprises the conventional, sub-conventional and nuclear dimensions.

- On the conventional front, the desire on Islamabad's part to deal with India's superiority through a large conventional build-up, and how the alliance with the United States (in the 1950s, 1980s and post-9/11) and its continued close ties to China, has aided in that process.

- Owing to a reduction in U.S. dependency on Pakistan there has been a dwindling of confidence and reliance on U.S. help and assistance, and as a result, Pakistan has been looking for other options of suppliers. The example is a defence agreement between Russia and Pakistan, including the delivery of at least 36 Mi-35 helicopters to Pakistan, was cited as a pointer to the extension of options.

- Even though the conventional acquisition was being done for counter-insurgency purposes, the capability could and would be used against India.

- In regard to the nuclear dimension, the continued usage of the elements of "uncertainty" and "consistent inconsistency", which have typified Islamabad's nuclear posture of "rational



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irrationality”, leading to a tendency of deliberately causing confusion. Overall, the nuclear build-up is indicative of the fact that Pakistan now has both counter-value and counter-force nuclear options.

- Concerning the sub-conventional dimension, “covert war” had remained central to the Pakistan Army’s political, ideological and military strategy against India since 1947.

- As with terrorism, there is a need for fast track anti-terrorism courts.

- At the domestic level, there is conscious attempt on the side of the military to uplift their image over the last 6 months.

- The significance of the military and its supremacy was reinforced by the political crisis under the aegis of Imran Khan and Qadri.

- Stress was given on the continued use of a tactical approach rather than a strategic one while combating militancy and terrorism, and called for a unified civil-military approach in tackling this issue.

- On Pakistan’s policy towards Afghanistan, Islamabad may not look for “strategic depth” in Afghanistan, the core issue would still remain, as the objectives haven’t been completely fulfilled yet.

- Looking ahead to the future, there could be possible continued use of the three-fold strategic posture by Pakistan.

- The altering of the strategic calculus on part of the Pakistani military and civilian elites look uncertain, and the military would continue to remain supreme in the near future.

The second speaker of the session, **Group Captain Ashish Singh, Station Commander, AF Station, Awantipur**, discussed the ‘Sino – Indian Defence Relations in the coming decade’. He noted the Chinese history of “isolation, self-absorption& narcissism and an inherent nature of complacent defensiveness” from a geographic, socio-cultural and strategic culture point of view.

The following were some of the key issues raised by him:



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- The five periods of Sino-Indian relations from 1949-2014 were outlined; i) '1949-1964: Independence to Enmity', ii) '1965-1977: Cold War & the Sino-Pak Nexus', iii) 1978-1987: Four modernizations and economic peace, iv) '1988-1998: Political Rapprochement & Regional Geopolitics', v) '1999-2014: Economic Co-op & Strategic Competition'.
- Four vectors were identified to describe Sino-Indian relations; International, Domestic, Economic and Military.
- The myriad issues affecting the relations between the two Asian powers were also highlighted which included border issue and border transgressions; the issue of Tibet and the watch-out period until the selection of the next Dalai Lama; economics and how the commercial pacifist theory of economic dependency leading to peace could not be applied to the Sino-Indian relations "as the trading volumes are not large enough to avoid conflict" between the two very different economies suffering from both trade and trust deficits; competition in the multilateral institutions; military; over-reliance by the media on both sides of the border, on the sentiments of nationalism and how that was only resulting in the hardening of the stands on the border issues in both countries.
- The complexities pertaining to economics were further explained with regards to energy security concerns of the two resource-hungry developing economies which is leading to an increase in the quest for influence in the Indian Ocean Region on part of both the countries. In this regard, Chinese "String of Pearls" strategy was discussed and he observed that the countries which are being run by military juntas were easy to be swept off by Chinese influence in return for cheap military supplies.
- On military issues, it was further discussed that the two major military trends emerging out of China are the change from quantitative superiority to qualitative superiority; and, from a defensive ground force to force projection.
- Talking about the media discourse, he stated the Inter-service rivalry was seen as another factor that had the "potential to inflame existing flashpoints".



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- Finally, aspect of the current leadership in the two countries was also analysed and it was concluded that Prime Minister Narendra Modi's agendas are focused on development of the economy. President Xi Jinping's quest for fulfilling the "Chinese Dream" could open scope for convergence and further development of China-India relations, especially on the economic front, which would also work well for achieving overall peace.

- Looking forward to the next 10 years, it was predicted that the "pragmatic competition" between the two countries over energy and global & regional influence would be managed by the bilateral mechanisms in place. However, the border and Tibet issues still had a potential for conflict.

The third speaker, **Professor Mahapatra, Professor of School of International Studies, Jawaharlal Nehru University**, spoke about the 'Role of the U.S. in the Region post-2014'. Following are some of the key points covered by him:

- Amidst the American economic revival and the withdrawal of the U.S. and Coalition forces in 2016, the role of U.S. was identified.
- Through the recounting of the U.S. and NATO statements in relation to the 2014 withdrawal of forces, he substantiated the need for continued socio-economic & military assistance and training to Afghanistan.
- The problem of lack of any comprehensive information on the actual ground realities is a major issue.
- In regard to the continued presence of terrorist and militants, the issue of the TTP against Pakistan from the Afghanistan side of the border, and there is a steady presence of various other terrorist groups who have continued to take refuge along the Af-Pak border areas. More recently, there have also been reports of the Islamic State's purported attempts at finding a foothold in Afghanistan.
- Despite the growing sense of unpopularity and the grave nature of the Afghan war vis-à-vis the larger American politics and society, it wouldn't be wise to base analysis or form conclusions



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about the Afghan war's end based on the reduction of troops, as the war is not over and it is not likely to be in the near future.

- Various reports have stated that a lot of work is yet to be done in Afghanistan and how the U.S. is not yet ready to take complete control. The rampant corruption among the various state institutions in Kabul was more of a concern than the Taliban.
- Stress was given on how India needed to be wary of any appreciation on part of the U.S. on India's role in Afghanistan, as the U.S. has (since the time of the Clinton administration) and is likely to continue making "secret" deals with Pakistan and the Taliban, which may have adverse effects on India's role in Afghanistan.
- The U.S. interests in Afghanistan is sinking to unprecedented levels as a result of highly negative public sentiments (much worse than for the Vietnam and Iraq wars) towards the issue, and this has been further echoed by the loss in interest in the U.S. Congress.

Concluding Remarks

The Chair, while summing up the session, highlighted the need for greater convergence on the part of India and Pakistan vis-à-vis Afghanistan. While agreeing with Group Captain Singh's observations, he expected a competition between India and China, but conceded that there was space for both to take care of their national interests without leading to any conflict. Looking ahead, he focused on the ability of the leaders in the region, namely Prime Ministers Modi and Abe and President Xi Jinping to concentrate on economic development of Asia. Hence, he expected economic and energy issues to be the dominant forces of geopolitics in the region in the near future, which would make maritime security an important area of concern.



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Space in National Defence: Legal and Technological Dimensions

Session III

Day 2, February 4, 2015

The first session of Day 2 covered “**Space in National Defence: Legal and Technological Dimensions**” chaired by **Air Vice Marshal R.D. Mathur, ACAS Ops (Space)**. He pondered deeply on the exploration of space over the last six decades stressing on how space has caught the attention both for civil use and for military purposes. Military activities according to the Chair had gained critical dimension that nations seek to possess in this Century and states are vying for space control. This tussle increases the vulnerability of space assets, and also results in space debris. While the Chair focused on the need to govern space activities, he pointed out the lacunae in doing so; that the treaties and laws of outer space have not been able to keep pace with the rapid space program. Therefore, there is a need to revisit the treaties especially as space is getting exploited for national defence.

The session started with the first speaker **Dr. Ranjana Kaul** who delved into ‘**Outer Space Legal Regime**’. At the very outset, the speaker laid stress on the importance of outer-space which included natural resources, orbits, orbit slots, the moon, celestial bodies, and electro-magnetic spectrum. While briefing the audience on Operation Desert Storm, she further highlighted on how there has been a rapid commercialization of space since then. The following issues pertaining to space were discussed in detail by the speaker:

- States want unrestricted safe access to outer-space and its natural resources.
- Eleven countries have indigenized space launch capability.
- More than sixty countries own and operate satellites.



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- Global satellite industry revenues have tripled from 2004, with an average annual growth of 11%.
- Public and private sectors are playing an important role in this sector.
- Space tourism gaining prominence.
- Relevance of global space sector.
- The complications of space debris laying stress on the 2009 incident when the Iridium satellite was hit by Kosmos 2251 satellite. Debris caused by ASAT tests remains crucial to security. However, this issue is dominated by geopolitical constraints and while China has been accused of debris, the US is also responsible for the same, but has never been accused for the same. As space commerce develops, the asset value of other orbits (MEO/LEO) will increase as will the threat from space debris. Even if all future launches are cancelled, space debris will continue to increase as a result of upper stage explosions and subsequent collisions (NASA reports).
- There is an implication of outer-space race with multiple players.
- United Nations General Assembly which laid down provisions on peaceful use of outer- space (Resolution 1148 (XII) of 1957 and Resolution 1721 (XVI) of 1961).
- Other outer space binding legal regimes were the Outer Space Treaty (1962), Rescue Agreement (1968), Liability Convention of 1972, Registration Convention of 1974, Moon Convention 1979, Constitution Communication (2014) and Radio Regulations.
- However, there has been no new treaty signed after the Outer Space Treaty in recent times since the need for a new treaty was not felt. At the same time, the Outer Space Treaty does not provide delimitation of outer space.



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- Another limitation of the Outer Space Treaty is Article IV which allows military activities using outer space unless otherwise specified by another treaty or customary international law; therefore, the problem of military space assets like reconnaissance satellites, communication satellites, remote sensing satellites, PNT satellites, and meteorological satellites.
- However, under Article VIII of the OST dealing with the registration of space objects, there is some ray of hope.
- Article IX of the OST deals with the issue of harmful contamination of extra terrestrial matters which could cause changes in the environment of the Earth. However, how effective is the legal regime in dealing with this threat remains a big question.

The issue of Graveyard Orbit was also discussed since it has significant value to Earth commerce. Space-craft are intentionally placed at the end of their operational life in order to lower the probability of collision with operational spacecraft in GSO. However, Governments/space agencies have taken steps. For example, US FAA regulations require satellites launched after 18th March 2008 to be transferred to the graveyard orbit 300km above GSO.

- The current constitution of the Earth's orbital environment and its future viability are far more fragile than people are willing to admit.
- Absence of definition 'clause' also remains a problem. For example, during the Cold War, the Soviets wanted 'peaceful' to imply non-military while the United States wanted it to connote 'non-aggression.'
- Fear that the doctrine of pre-emption might exist in outer-space.
- There is also an absence of monitoring and verification.
- Doubts on the efficacy of space regulatory regime ensuring space security and unclear definition of 'weapons' is a further hindrance.



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- Prevention of Arms Race in Outer Space (PAROS) has been proposed by China and Russia but has been opposed by United States.
- Relevance of International Telecommunications Union (ITU) and its successes and limitations especially as state military uses GSO slots more and more.
- With an absence of power to enforce and no sanctions against violence, how much can OST and ITU deal with challenges in the 21st Century.

Wing Commander K. K. Nair, Senior Fellow, Centre for Air Power Studies, discussed in detail “**Emerging Technologies and Legal Implications**” regarding space security. His historical analysis of the issue was divided into three time frames; i) the pre-1967 era, ii) the post 1967 era and iii) the post 2007 era. Some of the highlights of this session are as follows:

- The pre-1967 era witnessed the effort by the two super powers to nuclearise space.
- Post 1967 era witnessed the development of Strategic Defence Initiative and Star Wars by the United States.
- By 1991, following the disintegration of the Soviet Union, funding for space program dropped considerably and the US rejuvenated its Space Based Interceptor program.
- Space was used for both military and civil purposes.
- Dual purpose satellites were being developed.
- Post 2007 era saw more players in the field of space technology; prolific technology was developed; thus, greater complications and therefore, need for more diplomacy.
- Laws of armed conflict could not deal with space weaponisation.



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- While Outer Space Treaty exists, new players such as Iran and North Korea had not showed positive steps towards the OST. While Iran had not ratified the treaty, North Korea had not signed the OST.
- The threat from non-state actors and criminals also exist which use SATCOM for drug trafficking, hawala transactions.
- There is also an issue of Mars orbit and deep space and not just Earth orbit.
- Aggressive capabilities on ASAT also remain a problem.
- The complications with Kinetic Energy, ASATs and Directed Energy Weapons.
- Threat of use of barium whose properties could lead in ASAT application.
- While the last significant treaty was signed 40years ago, this is due to lack of political will and not due to lack of legal options.

The last speaker of the Session was **Dr. Manpreet Sethi, Senior Fellow, Centre for Air Power Studies**, who dealt with “**Soft Law Options**” in which she highlighted the low appetite for new legal regime. However, as no state wants anarchy in space and given the low appetite for new legal regime, the speaker aimed to highlight if there was an effort for any soft law option. The main highlights of her session are as follows:

- There is a boom in private players for commercialization and tourism.
- There is no convergence of great power interests since there is a heterogeneous set of participants.
- Any legal regime would no longer be bilateral and would no longer be a straight forward exercise.



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- There is also limited mandate of UN COPUOS while there are no takers for PPWT.
- There is an increasing military use of space to support combat.
- There is also a parallel growth of counter-space technologies.
- Soft Law Options are thus necessary.
- Though many Soft Law options exist, the International Code of Conduct for Outer Space activities (ICOC) is the new proposed Soft Laws option proposed by the European Union in 2008 which imposes debris control and mitigation.
- India faces common threats of debris and trafficking and hence, need to protect interests through military and diplomatic initiatives.

While the question of debris removal was raised in the question and answer round by **Air Marshal K. K. Nohwar, the Additional Director General at the Centre for Air Power Studies**, it was remarked that debris removal was not possible as of now. But on a positive note, it was pointed out that debris mitigation is possible.

Lastly, the session came to an end with the Chair concluding that high end technology was the driving agenda behind these laws and dominating states like the US would like to have full spectrum dominance. He also pointed out that the issue of Intellectual Property Rights would also need to be solved.



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Aerospace Technologies, its Exploitation in Recent Years, and Future Trends

Session IV

February 4, 2015

The session was chaired by **Air Marshal Vinod Patney** in which he emphasised the importance of aerospace power in the future and emphasised that future conflicts will be unknown, uncertain, unexpected and unprecedented and where the role of aerospace power will be critical. He also remarked that aerospace power would shape the strategic environment.

The first speaker, **Ms Cate Wilkinson, Director of Defence Customer and Partner Strategy, Rolls Royce** spoke on “Delivering through Defence Partnerships”. In her remarks, she pointed out the global nature of Rolls Royce which has customer bases in 150 countries while collaboration with various governments and leading aerospace companies has also happened. The following were the relevant issues to delve on:

- There was an emphasis on how Rolls Royce helps countries with a desire for self reliance by elaborating on some partnership models undertaken by the company for joint development of weapon systems.
- The Risk and Revenue Sharing Partners (RSPs) was stated to be the reason for the success of Trent 1000 engine.
- Business Drivers and Cultural Enablers were identified to be the key for strong partnership.
- India’s ‘Make in India’ campaign provides the business driver for partnership and stated that for a long term partnership both sides have to work on the cultural enablers.
- The long term association of Rolls-Royce with India was highlighted and that the company was eager to take it forward.



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Air Vice Marshal Andrew M Turner, AOC, 22 Group (Training), Royal Air Force, the second speaker, spoke on the 'Operational Lessons and Thoughts for the Future.' He spoke in the context of the United Kingdom and primarily focused on the lesson learnt, future trends and challenges for air-power. Some of the main highlights of this session were:

- There is an increasing trend of direct political interest in air power due to precision and flexibility it offers.
- With increasing precision the tonnage and yield of the weapons have reduced enormously which also has brought down the required size of the force.
- There is also a requirement for engaging in different theatres simultaneously.
- There is greater emphasis on finding and fixing with intent to reduce collateral damage, which is one of the primary political requirements.
- The issue of poor air-land and maritime integration needs to be addressed.
- The growing importance of Remotely Piloted Aircrafts (RPAs) and their relevance in future combat operations.
- On the support side, there are challenges in air-space density management, bandwidth and security for communication, training and need for reserves, bringing in civilian contractors for support roles.
- Unseen technology of the future will play a greater role in the employment of air-power.
- There is a need for an increased speed and reach.
- There is a need to create a global network of relationships, partners and opportunities to better meet the threats of tomorrow.



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Ian Draper

The third speaker, **Ian Draper, BAE Systems India** spoke on 'Collaborative Aerospace Programmes, Industry Perspective: Evolution, Present and Future.' He delved on the various collaborative fighter aircraft development programmes undertaken by the company and elaborated on the pros and cons of the projects. He laid stress on the vintage Tiger Moth aircraft and highlighted the cost, market base, shared R&D and interoperability as the key benefits in the project. Some of the main highlights of his session were as follows:

- On the downside, variation in culture, language experience, tax and accounting, security concerns and political complexities need to be dealt with.
- As with the case study of the British-French SEPECAT Jaguar project, the positive outcomes were the adoption of specially prepared International Procurement conditions and management procedures. However, the negative impacts were non-recurring cost due to duplication of final assembly, and lack of common language.
- For the Tornado project, the silver lining of the project were the creation of single customer contractor environment, shared risk and creation of long lasting political and industrial relations. However, the hurdles that were faced were complicated management and decision-making structure and duplication of final assemble lines.
- As regards the F-35 Lightning II, prime contractor arrangement is said to have provided for better decision making and also concentrating on the experiences of the partners were the greener side of the project. However, the limitations were Prime/Sub relationship with limited risk, limited customer interaction and lead customer requirements taking precedence.
- There was also a brief mention of the Hawk and Euro fighter Typhoon programmes.



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The Chair summed up the Session by acknowledging the relevance of aerospace technology in geopolitics.

Closing Remarks

In his closing remarks, the Director General, brought out the primacy of aerospace power as a tool of choice with nations, both for compellence and deterrence. He added that its role in projecting soft power and diplomacy also could not be over-emphasised. Referring to the recent Defence Technology and Trade Initiative (DTTI) with the US, he noted that while diversification in defence equipment supplies is the need of the hour, real aerospace power rests in indigenisation of aerospace technology and equipment. The DG opined that today's geo-political challenges could be counterweighted by geotechnical capabilities developed through government projects such as 'Digital India' and 'Make in India'. Furthermore, there would be an increased need to optimally employ aerospace power to ensure maritime security in furtherance of economic development agenda of the nation. He lauded the achievements of India in the field of peaceful exploration of space and advocated a bolder say in formulation process of space treaties, code of conduct and global control structures for this domain.

Air Marshal Patney thanked all panelists and participants for their valuable insights and active participation to make the 6th Jumbo Majumdar Conference a successful event.

Report prepared by Debalina Ghoshal (Associate Fellow), Arjun Subramanian (Associate Fellow), Prerna Gandhi (Research Associate) and Uday Deshwal (Research Associate).

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