

Draft Technology Transfer (TT) Policy 2021-2021:**Comments by ISpA**

1. At the outset, we thank the DoS for the opportunity to provide comments on the draft Technology Transfer (TT) Policy 2021.

Introductory Comments

2. ISpA welcomes DoS, ISRO and IN-SPACe initiative to invite Indian Private Industry for discussions on draft Technology Transfer (TT) Policy 2021. The intentions behind formulations of this policy are appreciated.

3. The Draft has been fully scrutinized which included in-house brainstorming with Industry Members as well as experts who have been working in the Satcom area. The ISpA has collated from inputs received from a wide variety of experts and industry which would include R&D, Production, Installation and Operators as well as Consultants who have been professionally associated with ISRO.

4. The Draft TT Policy Document addresses many aspects of TT including the categories and the process of TT. The scope of TT could also include buy-back products, consultancy and training services and support to Indian Industries to bid for international contract. It would be helpful, if the Policy also identifies the respective roles of different organs of DOS in the context of TT. It also would be helpful if the legal and regulatory aspects are also addressed. It is hoped that the final policy document would address these aspects along with other suggestions provided. Some of the key aspects which merit consideration are covered in the succeeding paragraphs.

5. **VISIBILITY OF TECHNOLOGIES AVAILABLE FOR TRANSFER ON ISRO WEBSITE.** The TT should be on any technology developed and held by DoS, which the Indian industry identifies for market exploitation. As per the DOS TT Policy document (2021), Department of Space is for transferring technologies to the Indian enterprise and non-profits, in a non-exclusive

mode. Such Technology Transfers are already done on a routine basis. As per ISRO website itself (2016 time frame), over 300 technologies have been transferred to Indian industries. Some aspects which could be considered are as under:-

- (a) To continue this effort, ISRO web site should periodically update the list of products for Technology Transfer and interested parties can approach ISRO as per the policy guidelines.
- (b) A procedure for interactions and request for trying out the technology in the market.
- (c) Once the industry is successful, then TT should be done.

6. TIME LINES FOR AVAILABILITY OF TECHNOLOGIES

It should be ensured that all the processes for technology transfer be made available with strict timelines to ensure that the dynamic pace of the industry is set to global standards. The relevant authorities should also be appointed to supervise and act as decision maker in case of disputes arising out of the policy framework. It is proposed to include the following:-

- (a) Eligibility based assessment by Department of Space should be bound by a time-period of 15 Days, which may be extended by another 15 days for classified technologies.
- (b) Transfer of Technology Process should be bound by a time-period of further 15 days which may be extended by another 15 days for classified technologies.

(c) Query Reply Process should be set in place with query response time by Industry Players and Department of Space, NSIL, ISRO should not be more than 2 working days.

7. **COST CALCULATIONAS PER CAS18.** The following aspects merit consideration:-

(a) While adopting the costing principles given in the draft Policy, it may be prudent to consider following major issues with respect to Technologies already developed / stabilised by ISRO (such as Main Frame IMS 1/2/3 for Small Satellites, EO / SAR / Comn. Transponders on Payloads by SAC)

(b) All ISRO costs for development, manufacture, testing, qualification have already been met by DOS funding ISRO. This money is tax payer's money, well spent by DOS / ISRO on such projects. Since, it is already funded by citizens of India, is it proper to include the cost of development as given at Para 11.1 of the draft Proposal?

(c) DOS / ISRO is not a "money-making" and commercial organisation, but meant for addressing the needs of common citizens and Indian Industries.

(d) If the TT costs are "loaded" or "over-loaded", the manufacturing costs from Indian Industries will become uneconomical and hence, Industries lose out in competitive bidding process in Indian & International Markets.

(e) Since, Indian Industries in Satellite manufacturing domain are just finding their feet and ISRO is the fountain-head of technology development, so far in Space Domain, DOS & ISRO may please

consider reducing TT costs to a “nominal” amount, say, not more than 1/10th of the amount calculated as per method of estimation given at Para 11.1 of the draft policy (to be divided by the number of Industries asking for such TT) and to totally delete additional costs of development given at Para 11.2.

(f) Para 11.2.1 – Cost calculation as per CAS-18. Following aspects may be considered.

(i) While sub-paras 11.2.2 to 11.2.2.5 and 11.2.3 of CAS-18 are quoted in the draft policy, other important paras of CAS-18 are conveniently omitted. For eg- “5.2 of CAS-18- Subsidy / Grant / Incentive or amount of similar nature received / receivable with respect to Research and Development Activity, if any, shall be reduced from the cost of such Research and Development Activity.”

(ii) Above para 5.2 of CAS-18 clearly means that since ISRO has received “Subsidy / Grant / Incentive or amount of similar nature” from DOS / GOVERNMENT OF INDIA for undertaking the development, it shall be “reduced from the cost of such Research and Development Activity”.

(iii) Hence, all costs incurred by ISRO on R&D of its projects / products, which have been funded by Government of India , cannot be charged to the Indian Industry as TT costs.

(iv) Above also means that only such products / projects of ISRO which are NOT funded by Government of India out of tax payer’s money, are only to be charged as TT costs to Industries.

- (v) Proper interpretation of CAS-18 results in “ZERO TT COSTS” to Industries for developed products / projects of ISRO. Above needs serious introspection by DOS / ISRO.

8. **LIMITED TECHNOLOGY TRANSFER MODEL**

- (a) This model is proposed to enable the industry players who have been participating in global opportunities to provide end to end solutions in lieu to match up the economics of revenue sharing and joint ventures, to license the technology on a project basis.
- (b) Indian players have been extensively relying on global partners for technology availability and providing solutions in foreign countries.
- (c) In such project models, the technology is licensed from a foreign entity such that a JV or revenue sharing model for the project is relied upon to compensate for contributing by the way of technology.
- (d) The limited technology transfer model will enable the private players to undertake projects of similar nature and allow Department of Space to generate more revenue considering the greater revenue sharing amounts that can be charged.
- (e) The said model may be made subject to suitable limitations so as to not compromise the objectives this framework is set out to achieve.

9. **ASSURED ORDERS FROM DOS.** Some options assured orders could be considered.

10. **PROVIDING OF SOURCE CODE**

(a) In general TOT without software source code hampers the recipient from further developing and enhancing the technology received.

(b) Many times the TT is taken in anticipation of getting customer orders, other than from ISRO. In such cases, customer specifications are often at variance to TT product specifications. The TT recipient is required to modify the Hardware and software to meet such requirements. The department who developed the technology may be reluctant to take-up these incremental improvements due to their on-going / future projects, leading to limitations to commercialize the TT taken. Also due to obsolescence of Firmware, both hardware and embedded software may have to be replaced. Without Source Code, the product, thus, becomes obsolete and the TT may not be of much practical use. It is suggested that the limitation of providing Source Code can be removed, so that the TT is complete including Source Code.

(c) If making available software codes to Industries is not practicable / desirable due to security reasons, the modifications / adaptations to software that may become necessary should be undertaken by ISRO on priority basis quickly, free of cost and with association Industries at various ISRO's developmental centres. IPR for such changes should be owned jointly by ISRO & Industries (as per Para 7.2 of draft policy).

(d) By exception where software source code has special IP rights or is common across a variety of critical applications used by DoS then such source code may not be transferred.

10. **PARA 6.6 “REQUEST FOR PROPOSAL” (RFP). Request for clarity.**

(a) It is felt that there may not be any need for “RFP”, as no bidding process is involved. DOS/NSIL should publish list & details of TT (including cost of TT) being offered (as is being done by ISRO through its notifications, at present) and interested Industries should respond with their details for DOS/NSIL to provide TT to the Industries based on their capabilities / interest

(b) The transfer of Special technologies relating to higher end systems & products such as satellites & launch vehicles through a “Request for Proposal” is ambiguous. What if an Industry seeks such a technology for commercialisation – will it have to wait for a RFP to be issued to be eligible to obtain such ToT? Technology Transfer Costs having been defined by the policy, surely the RFP is not a reverse auction process seeking the highest bidder for the technology? Or is the RFP meant for assessing the capabilities and track record for absorbing and commercialising the technology?

11. **TT TO ACADEMIC INSTITUTIONS. Therefore to achieve Para 4.0 objectives** - this know-how particularly classified and critical technologies which ISRO obtained **need to be transferred on a no cost basis to certain government owned academic institutions for making engineers industry ready .**

12. **RESALE AND M&A.** The policy is silent on whether an industry which obtained license for a particular Technology can resell it to other party in case the firm fails to produce any finished product. Generally in industry, mergers and acquisitions of start-ups are common. The TT policy is silent on what

happens in such cases. On requirement of specific niche technology which ISRO do not have (in current) under TT, then what would be the modus operandi of industry in approaching ISRO is not mentioned in the policy

13. **INFRA AND FINANCIAL SUPPORT TO START-UPS/MSMES.** At present, barring a few commercial players in space domain, most of the players are start-ups, which require support from DoS in terms of infrastructure, financial assistance etc. Accordingly, the cost of TT has to be justified or encouraging for start-ups. Start ups and MSMEs have huge potential and they can provide innovative products using technologies developed by DoS, hence their inclusion in the process need to be ensured.

14. **GRIEVANCES AND DISPUTE RESOLUTION.** The grievances and dispute resolution mechanisms needs to be included for **COMPLETENESS SAKE.**

15. **JOINT DEVELOPED TECHNOLOGIES.** The first right for commercial exploitation need not necessarily rest with DoS for such jointly developed technology and could rest with the industrial development partner so as to speed up commercialisation, unless the technology so developed is of strategic national importance. In such cases, either party will have to license the other party's background IP or co-developed foreground IP for commercial exploitation of the technology on equal and pre-decided terms. This is important to create an environment to support investment in IP creation by Industry. The approach should be more in line with the approach defined in Para 7.2 for co-development of technology solutions.

16. **DEVELOPMENT OF CAPABILITIES OF PRIVATE INDUSTRY AS A STRATEGIC GOAL OF TT POLICY.** The strength of the nation also critically depends on the strength and capabilities of the private industry in high-tech

sectors. In Section 1 and Section 3 of the Draft TT document, the development of capabilities of private industry as a strategic goal can be included by adding the word 'strategic' along with economic, societal and eco-development.

A. The applicability & value of both TOT and Royalty must be different for different cases arising out of the three dimensions ie. Category of Tech (6.1 to 6.6); ToT Stages (8.1.1 to 8.1.3) and type of End User Customers (GOI; Indian End Users; Others).

B. The Royalty has to be for a limited no of repetitions or for a limited period; but can not be indefinite

C. TTC and Royalty should not be applicable where the Mission or End user is GOI

D. ToT should be given only to 'INDIAN' Companies as per Companies act 2013

E. Eligibility for obtaining ToT is not clear;]

17. **OTHER MAJOR ASPECTS.** Following aspects may be considered:-

(a) **Collaboration Approach for TT-** Technology Development work can be identified right from conceptual stage and carried out jointly by ISRO and private actors. Example- State of the Art Satellite Bus Development for identified applications; Launch Vehicle Interfaces for multiple satellite launches.

(b) **Contract Approach for TT** -ISRO can identify product which will be required by the Space Industry and issue contract to private companies for development of the Technology. This will also facilitate ISRO engineers to work with private companies. This is to involve private sector in generating new knowledge or technology necessary to solve a problem.

(c) **Exchange of Resources Personnel for TT** - Deputation of ISRO engineers to work in private companies on joint development work. Similarly ISRO may allow personnel working in private companies to work in ISRO facilities.

(d) **Consultancy Services**

(a) ISRO to provide Consultancy Services to private companies to support establishment of space based system to provide services.

(b) ISRO to provide Consultancy Services to private companies to support establishment of new facilities. (Process of establishing facilities).

(c) ISRO to provide Consultancy Services to private companies to support the development of new technologies.

**TECHNOLOGY TRANSFER (TT) POLICY, DOS- 2021 FOR INDUSTRY
CONSULTATION: Para-wise Comments**

1. **Para 1.0**

Member-1. Special mention of SMEs, start-ups should be included. Existing enterprises are occupied with their identified lines of business and they may not need any new technology.

2. **Para 2.0**

(a) **Member-1.** DoS though its sole entity ISRO has been concentrating on development of technology through hardcore R&D. It needs partners to convert these into engineering solutions and to take them to the market with due modifications and adaptations, which is best done by commercial companies.

(b) **Member-2.** The Policy shall emphasize that foreign subsidiaries obtaining the TTs and developing the products should have indigenous contents in the products. **This policy should supersede all existing arrangement for TT**

(c) **Member3.**

(i) TT should be given only to 'INDIAN' Companies as per Companies act 2013.

(ii) Request for clarity on Eligibility Criteria for obtaining TT.

3. **Para 4.0**

(a) **Col. Velan (Elena)-** The objective should be clear and precise and should lead onto one interpretation only.

(b) The stated serials are very vague. Eg., serial No 7 can be interpreted as having to make restrictive policies. THIS COULD BE REWORDED.

4. **Para 5.0 -**

(a) **Member-1.** No specific set should be given. The TT should be on any technology developed and held by DoS, which the Indian industry identifies for market exploitation. To enable this, a standard mechanism should be created, like listing the technologies within each lab / org. of ISRO, a procedure for interactions and request for trying out the technology in the market. Once the industry is successful, then TT should be done.

5. **Para 6.1**

(a) **Deepika Jey. Request for consideration of the following:-**

(i) *[...non-space domains]* - Does this statement restrict the use of commercial technology by users in the space domain?

(ii) *[...non-exclusive basis]* - Exclusivity doesn't have to be absolute. In some instances, a business case is valid only if the user has a marked advantage over another. Exclusivity can be whole, or split based on duration, application, geography.

6. **Refer Para 6.2**

(a) **Member-3.** TT, especially for para 6.2 type needs to be given only to those Indian Companies who have executed/executing classified/strategic programs, or those who have part stake by GOI.

7. **Refer Para 6.3** [...*The first right for commercial exploitation shall be with sponsor i.e. DOS*]

(a) **Member-5.** The first right for commercial exploitation being reserved with Department of Space shall adversely impact participation of industry in Research Level and Development Level as identified in Point 8 of the Draft Policy Document.

(i) It is recommended that the commercialization potential of technologies jointly development should not be limited for private players.

(ii) A mutual agreement to allow commercialization at par with market standards setting out suitable royalties to be paid on Sales Turnover be instituted.

(iii) Given that NSIL is the specialized commercialization arm for the Department of Space, all joint research commercialization should be made subject to flexible models to achieve optimum economics and greater market capitalization in consultation with NSIL.

(b) **Member-2. Joint Developed Technologies.**

(i) The first right for commercial exploitation need not necessarily rest with DoS for such jointly developed technology and could rest with the industrial development partner so as to speed up commercialisation, unless the technology so developed is of strategic national importance.

(ii) In such cases, either party will have to license the other party's background IP or co-developed foreground IP for commercial exploitation of the technology on equal and pre-decided terms. This is important to create an environment to support investment in IP creation by Industry. The approach

should be more in line with the approach defined in Para 7.2 for co-development of technology solutions.

8. **Para 6.4** [...societal application]

(a) **Member-5.** Is a societal application considered not-for-profit? Some business models allow for both 'social impact' and 'profit'. A split pricing can incentivise the recipient of the technology to do both. For example, say X creates a product that can be shared for free, why should the DOS even charge a subsidised pricing? X is the party adding value and disseminating. X can further be **permitted to sell for profit a premium of the same product for commercial users. In this case, DOS could charge a standard commercial rate even.**

9. **Para 6.5**

(a) **Member-4.** - Does the DOS have any OSS? If yes, it could also consider imposing on the users that- any creation of theirs will also become OS. Helps with wider dissemination of knowledge and therefore achieving the objectives of this policy more easily.

(b) **Member-6.** Requests for consideration of the following:-

(i) Many times the TT is taken in anticipation of getting customer orders, other than from ISRO. In such cases, customer specifications are often at variance to TT product specifications. The TT recipient is required to modify the Hardware and software to meet such requirements. The department who developed the technology may be reluctant to take-up these incremental improvements due to their on-going / future projects, leading to limitations to commercialize the TT taken. Also due to obsolescence of Firmware, both hardware and embedded software may have to be replaced. Without Source Code, the product, thus,

becomes obsolete and the TT may not be of much practical use. It is suggested that the limitation of providing Source Code can be removed, so that the TT is complete including Source Code.

(ii) If making available software codes to Industries is not practicable / desirable due to security reasons, the modifications / adaptations to software that may become necessary should be undertaken by ISRO on priority basis quickly, free of cost and with association Industries at various ISRO's developmental centres. IPR for such changes should be owned jointly by ISRO & Industries (as per Para 7.2 of draft policy).

(b) Member-2. (Software). In general TOT without software source code hampers the recipient from further developing and enhancing the technology received. By exception where software source code has special IP rights or is common across a variety of critical applications used by DoS then such source code may not be transferred.

10. **Para 6.6 RFP**

(a) **Member-6.** It is felt that there may not be any need for "RFP", as no bidding process is involved. DOS/NSIL should publish list & details of TT (including cost of TT) being offered (as is being done by ISRO through its notifications, at present) and interested Industries should respond with their details for DOS/NSIL to provide TT to the Industries based on their capabilities / interest.

(b) Member-2. (Special Technologies). The transfer of Special technologies relating to higher end systems & products such as satellites & launch vehicles through a "Request for Proposal" is ambiguous. What if an Industry seeks such a technology for commercialisation – will it have to wait for a RFP to be issued to be eligible to obtain such ToT? Technology Transfer Costs having been

defined by the policy, surely the RFP is not a reverse auction process seeking the highest bidder for the technology? Or is the RFP meant for assessing the capabilities and track record for absorbing and commercialising the technology?

11. **Para 7.1.3**

(a) **Member-4.** What is meant by this? Why can't a recipient use such IP for further research? This is to be clarified, as it can limit what recipients can do with the IP. The DOS can inherently build in mechanisms for how they gain a RoI on such IP. For example, the IP developed by the recipient can be given free-of charge to the DOS for use in space domains (if it is non-space recipient), or an exchange mechanism for a recipient in the space domain.

12. **Para 7.1.4** [*...however the commercial rights shall be with Sponsor i.e. DOS*]

(a) **Member-4.** This only makes sense if this is fully funded by DOS for strictly governmental projects. Please see comment above on right of first refusal and distribution of exclusivity. The DOS will benefit greatly if it loosens its control and in return tries to gain from more innovation – ex. Also spin-ins. For example, if commercial rights are shared, then there is more scope of Public-private partnerships that can benefit more stakeholders, lessening risk and time to market, attract private funding etc.

13. **Para 7.1.5** [*...Non-Disclosure Agreement (NDA)*]

(a) **Member-4.** An NDA makes sense in any case for information that is confidential. Why just with industry? Every stakeholder involved must be aware of confidentiality classifications.

14. **Para 7.2** [*...DOS shall be the joint owners*]

(a) **Member-4.** Imagine it a start-up. The value addition made to the IP may be the start-ups core IP. DOS receives a royalty or provides the tech at a price, what benefit does the DOS gain from being a joint-owner? This can become restrictive if the start-up is then fund-raising also with other parties. If IP (as an asset) is owned by multiple parties there is always a tax (especially for cross-border cases) and accounting impact.

(b) Instead, the DOS can consider how it can benefit from the value addition made by the licensee. For e.g the DOS may instead receive a perpetual, non-exclusive, royalty-free right to use it for non-commercial purposes within its own projects.

15. **Para 8.0**

(a) **Member-4.** How will this be interfaced with the categories of technologies?

16. **Para 8.2** [*...spin-off applications*]

(a) **Member-4.** There is also enough opportunity for spin-ins.

17. **Para 9.1** [*...8 years*]

(a) **Member-4.** Request basis of arriving at this number of 8 years?

18. **Para 9.0**

(a) **Member-1.** Licensing should start only when the Technology is proven to be useful for the public. The entire effort should be funded by the Government through special initiatives / incentives like the Idex of the DRDO.

19. **Para 10.0 (TIME LINES)**

(a) **Member-2.** It should be ensured that all the processes for technology transfer be made available with strict timelines to ensure that the dynamic pace of the industry is set to global standards. The relevant authorities should also be appointed to supervise and act as decision maker in case of disputes arising out of the policy framework.

It is **proposed to include-**

(i) Eligibility based assessment by Department of Space should be bound by a time-period of 15 Days, which may be extended by another 15 days for classified technologies.

(ii) Transfer of Technology Process should be bound by a time-period of further 15 days which may be extended by another 15 days for classified technologies.

(iii) Query Reply Process should be set in place with query response time by Industry Players and Department of Space, NSIL, ISRO should not be more than 2 working days.

20. **Para 10.0**

(a) **Member-6.** As CTTC gets approval from DOS for TT , it is not understood as to why another MOU between DOS & NSIL is required and also its relevance to Industries. This may be reviewed.

21. **Para 11.0**

(a) **Member-1.** Why should costing be included? Technology developed using the public fund and being put for public use. Cost sharing should be done when the products are sold outside the country. If costing is there, then there is no 'licensing'.

(b) **Member-6.** While adopting the costing principles given in the draft Policy, it may be prudent to consider following major issues with respect to Technologies already developed / stabilised by ISRO (such as Main Frame IMS 1/2/3 for Small Satellites, EO / SAR / Comn Transponders on Payloads by SAC)- -

(i) All ISRO costs for development, manufacture, testing, qualification have already been met by DOS funding ISRO. This money is tax payer's money, well spent by DOS / ISRO on such projects. Since, it is already funded by citizens of India, is it proper to include the cost of development as given at Para 11.1 of the draft Proposal?

(ii) DOS / ISRO is not a "money-making" and commercial organisation, but meant for addressing the needs of common citizens and Indian Industries.

(iii) If the TT costs are "loaded" or "over-loaded", the manufacturing costs from Indian Industries will become uneconomical and hence, Industries lose out in competitive bidding process in Indian & International Markets.

(iv) Since, Indian Industries in Satellite manufacturing domain are just finding their feet and ISRO is the fountain-head of technology development, so far in Space Domain, DOS & ISRO may please consider reducing TT costs to a "nominal" amount, say, not more than 1/10th of the amount calculated as per

method of estimation given at Para 11.1 of the draft policy (to be divided by the number of Industries asking for such TT) and to totally delete additional costs of development given at Para 11.2.

(v) **Member-3.** The applicability & value of both TT and Royalty must be different for different cases arising out of the three dimensions. **ie.** Category of Tech (6.1 to 6.6); TT Stages (8.1.1 to 8.1.3) and type of End User Customers (GOI; Indian End Users; Others).

22. **Refer Para 11.1** (Costing Principles). The costing of a technology considers the cost of materials & services consumed during development life cycle. Often times during the development life cycle many prototypes are built and validated thus significantly increasing the cost of development. The development cost should be restricted to costs incurred till realisation of first successful prototype of the product/system/technology.

23. **Para 11.2.1** – Cost calculation as per CAS-18

(a) Member-6. Request for consideration of the following:-

(i) While sub-paras 11.2.2 to 11.2.2.5 and 11.2.3 of CAS-18 are quoted in the draft policy, other important paras of CAS-18 are conveniently omitted. For eg- “5.2 of CAS-18- Subsidy / Grant / Incentive or amount of similar nature received / receivable with respect to Research and Development Activity, if any, shall be reduced from the cost of such Research and Development Activity.”

(ii) Above para 5.2 of CAS-18 clearly means that since ISRO has received “Subsidy / Grant / Incentive or amount of similar nature” from DOS / GOVERNMENT OF INDIA for undertaking the development, it shall be “reduced from the cost of such Research and Development Activity”.

- (iii) Hence, all costs incurred by ISRO on R&D of its projects / products, which have been funded by Government of India , cannot be charged to the Indian Industry as TT costs.
- (iv) Above also means that only such products / projects of ISRO which are NOT funded by Government of India out of tax payer's money, are only to be charged as TT costs to Industries.
- (v) Proper interpretation of CAS-18 results in "ZERO TT COSTS" to Industries for developed products / projects of ISRO. Above needs serious introspection by DOS / ISRO.

24. **Para 11.3**

- (a) **Member-3.** TT Cost and Royalty should not be applicable where the Mission or End user is GOI

25. **Para 11.3** [*...10% of Technology Development Cost (TDC)*]

- (a) **Member-4.** The TDC has inefficiencies in process, as opposed to what a commercial party would. If the same technology is transferred to say 10 parties, then the TT al costs are already recovered. If the objectives in 4.0 are to be truly met, then a different model to get ROI for the DOS needs to be ascertained. For ex see above some recommendations on how the DOS can claim benefits.

26. **Para 11.3** [*...Technology Development Cost includes cost towards essential training & hand holding, in case, any special training required as suggested by ISRO centre, it shall be accounted separately over and above the TTC]*

- (a) **Member-4.** It is not clear if this is optional or mandatory in some cases. Any Tech transfer would ideally provide everything that the recipient needs to do the activity on their own. **Why would 'essential training' be an additional cost?**

27. Para 11.3

(a) **Member-5.** The present policy proposed 10% of Technology Development Cost as the Technology Transfer Cost (TTC) and 4% royalty of the sales turnover. The TTC is too steep for start-up players to participate with cost of R&D showcasing a reducing trend in the private sector. It is recommended that the payment structure for the TTC be changed as indicated below-

(i) Reduction of the TTC to 5% and adjusting the same to the end of royalties payable on sales turnover.

(ii) Making a deferred payment schedule for the TTC such that it does not impose on the cashflow challenges of SMEs and young enterprises. It is recommended that 20% of TTC be paid upfront and the rest be made payable in line with a yearly license fee payment schedule be structured for the same.

(iii) Introduction of additional limited technology transfer model on one off basis for stipulated projects with royalty-based payment only on the sales turnover where the royalties can be substantially higher

(b) **Member-3.** Maximum TTC (Tech Transfer Cost) (if any) should not exceed 5% of Total Dev Cost in line with DRDO TT policy.

28. Para 11.4 [...royalty of 4%]

(a) **Member-4.** How was this 4% derived? Why charge on sales instead of profit? This blanket royalty rate can affect recipients and their business cases differently. A good classification of the technology and users can help determine standard pricing for the different classes- Space/non-space; Extention of exclusivity; Core interests of the party;

etc. Such classification is beneficial also to NSIL/DOS as in some cases, they can charge more than the 4% royalty. I do not assume the DoS is really dependant on the royalty monies to be received. A 'Use-or-Lose' Mechanism can also be applied for example. If a recipient's business case fails, the DOS can also consider retrieving the tech/prohibiting the recipient from its use for x years. This was, the recipient can take some amount of risk in their business and experiment, without having the royalty as a fixed cost on sales.

(b) **Member-1.**– If the product is licensed, then the royalty is part of it. If cost is taken then there is no royalty.

(c) **Member-6.** Royalty costs to be reduced to 2% of sales turnover, as it affects the profit margin of Industries and also to be charged only when Industries are able to sell more than, say, 10 Nos Small Satellites.

(d) **Member-3.**

(i) The Royalty has to be for a limited no of repetitions or for a limited period; but cannot be indefinite.

(ii) The process and cost/royalty should be same for Pvt or Govt. companies.

(iii) Maximum Royalty (if any) should not exceed 2% in line with DRDO TT policy

(iv) There must a 5-10 year lenience period for the SPACE sector to establish and grow and become globally competitive. During this period the TTC & Royalty should not be applicable or refunded.

(d) **Member-2.**

(i) Tax rebate and nominal royalty on the products developed/manufactured using ISRO/DOS TT while purchasing the TT and selling the TT based developed products.

(ii) Higher licensing/royalty charges on DOS TTs to be charged for foreign subsidiary companies incorporated in India.

.....

Industry Comments For Additions In Proposed Policy**1. Member-5****(a) Disclosure and knowledge of available technologies**

(i) The technologies available across all categories except classified categories should be reflected in public portals with relevant facts for private entities to assess and scout for commercialization opportunities before participating in the transfer process along with timeline bound process for answer to limited enquires about the same. A crucial point for facilitation of this mechanism shall be relevant knowledge about availability of technologies held by Department of Space for commercialization and transfer.

(ii) This is crucial to effective commercialization as a host of eligibility and financial variables of projects are impacted if the technologies implemented and products manufactured are of Indian origin. This effectively means that an entity may choose to apply for Transfer of Technology after assessing its capability to commercialize the same or after having promising capability to commercialize. This shall ensure-

(aa) Risk mitigation by private entities in assessing ROI of the cost incurred for the technology transfer.

(ab) Effective and efficient commercialization of the technologies of Department of Space leading to better

returns by the way of royalties charged as provided under 11.4 of the Draft Policy documents.

(ac) Greater participation by the industry as greater sources of financing for the technology transfer would open in lieu of the mitigated risk.

(b) Limited Technology Transfer Model

(i) This model is proposed to enable the industry players who have been participating in global opportunities to provide end to end solutions in lieu to match up the economics of revenue sharing and joint ventures, to license the technology on a project basis.

(ii) Indian players have been extensively relying on global partners for technology availability and providing solutions in foreign countries.

(iii) In such project models, the technology is licensed from a foreign entity such that a JV or revenue sharing model for the project is relied upon to compensate for contributing by the way of technology.

(iv) The limited technology transfer model will enable the private players to undertake projects of similar nature and allow Department of Space to generate more revenue considering the greater revenue sharing amounts that can be charged.

(v) The said model may be made subject to suitable limitations so as to not compromise the objectives this framework is set out to achieve.

2. Member-2.

- (a) **Enforcement Clause:** The Policy shall ensure that the technology transfer is awarded to firms based on its technical, financial, heritage and merits.

Additional Suggestions/Approach For Consideration

1. The Draft TT Policy Document addresses many aspects of TT including the categories and the process of TT. The scope of TT could also include buy-back products, consultancy and training services and support to Indian Industries to bid for international contract. It would be helpful, if the Policy also identifies the respective roles of different organs of DOS in the context of TT. It also would be helpful if the legal and regulatory aspects are also addressed. It is hoped that the final policy document would address these aspects along with other suggestions provided.
2. **Knowledge Transfer Along With Transfer Of Technology.** That transfer of technology helps the target group in achieving their short term goals, transfer of knowledge would help them perfect the same over a longer period of time. Mere transfer of a particular technology would not be helpful if problems arise during its adoption process, but if the knowledge is there, it can be modified to suit the individuals needs and aspirations. Technologies may fade over time, but knowledge once gained would last a life time.
3. **Therefore to achieve Para 4.0 objectives** - this know-how particularly classified and critical technologies which ISRO obtained need to be transferred on a no cost basis to certain government owned academic institutions for making engineers industry ready .
4. **Board/Committee Member.** For refraining technology falling into adversary domain, through Non- Government Private entities, a service representative must be in the Board which ratifies the Technology Transfer.
5. **Certifications.** At some stage the TT Policy would need to incorporate aspects related to CERTIFICATION (may be like the CEMILAC way) or OEM

certification aspects. Not too sure, if the Licensing aspect mentioned here would cover this too.

6. **Commercial Space Industry Collaboration-** The concept of TT from ISRO has been existing since year 2000. Some of the technologies or IP's which have been transferred are like 11 MTR antenna technology used for TTC, Full Motion Antenna Mounts for Tracking Leo Satellites , Search and Rescue Beacons etc. However, there have not been a great interest shown by commercial space industry many reasons. Industry gains more financially if it collaborates more with ISRO during R&D cycle rather than buying technology from ISRO and ending up paying royalty as well as TT cost.

7. **Timeline For TT-** The time line for any TT is not mentioned. Strategic users/Industry would like to have quick gains and generally are unwilling to wait for years for TT to happen. Hence specific timelines are to mentioned for TT .

8. **Resale and M&A** - The policy is silent on whether an industry which obtained license for a particular Technology can resell it to other party in case the firm fails to produce any finished product. Generally in industry, mergers and acquisitions of start ups are common. The TT policy is silent on what happens in such cases. On requirement of specific niche technology which ISRO do not have (in current) under TT, then what would be the modus operandi of industry in approaching ISRO is not mentioned in the policy.

9. **Assured Business Returns /Buyback –**

(a) One of the strengths of ISRO technology efforts to support nascent Indian private industry has been buy-back provision. This has been helpful to the Indian private industry to invest into the niche technology product manufacture with assured buyer. The categorization of TT products can include such products.

(b) TT with certain buy back scheme for initial few years from DOS/NSIL to Industries especially for existing space supplier eco system of DOS/ISRO.

(i) Rebates & flexible commercial terms for the licensing fee for Industries which will encourage industries to get TTs from DOS.

(ii) Industries should be incentivized through schemes like PLI/MSIPs for the products developed/manufactured using the TT of DOS.

10. **Infra and Financial Support to Start-ups/MSMEs** - At present, barring a few commercial players in space domain, most of the players are start-ups, which require support from DoS in terms of infrastructure, financial assistance etc. Accordingly, the cost of TT has to be justified or encouraging for start-ups. Start ups and MSMEs have huge potential and they can provide innovative products using technologies developed by DoS, hence their inclusion in the process need to be ensured.

11. **Applicability to Strategic User Community** - DoS TT Policy-2021 lays out the mechanism for transfer of DoS developed technologies to Indian Industries from civilian perspective. Whereas, its applicability to strategic user community, such as armed forces in-house R&D, DRDO, NTRO, DPSUs, etc., is not specified. Therefore, strategic users, R&Ds and academia involved in developing technologies towards national security should not be considered under the ambit of this DoS TT policy-2021. Also, this policy should not come in the way of national security; instead a MoU/NDA sort of arrangement could be in place between strategic organizations and DoS for TT. Further, there

should not be any embargo in transferring any technologies/services developed by DoS for national security citing this policy.

12. Policy is Totally silent on TT to other govt agencies/ organisation like DRDO and PSUs. Going by this document ISRO has kept the option open for commercialising TT to PSUs like DRDO. That would cost us more if DRDO is required to work on technology developed and sold by ISRO. Both being govt agencies, there should be transfer of available technology to DRDO on no cost basis for minimising cost to exchequer. So, appropriate clause for transfer of technology to PSUs for national requirement on no cost basis needs to be included.

13. **Approving Authority** - It should not be left only to the DoS (i.e. Secy DoS) to decide on the TT. Indian National Space Promotion and Authorization Centre (IN-SPACe) approved by Government of India in June 2020 (which constitutes of a Chairman, Technical Experts for Space Activities, Safety Experts, Experts from Academia and Industries, Legal and Strategic Experts from other Departments, Members from PMO and MEA of Government of India) should be the approving agency after due ratification. All DoS decisions on TT should be cleared by IN-SPACe. From national security perspective, no single agency/department such as Secy. DoS (also Chairman ISRO) or NSCS be given the authority to decide on TT, even if it is developed by agencies under the ambit of DoS, as it can lead to prejudice.

14. **Exemption to Indian Defence Industries** - After due certification by Defence Space Agency (DSA), DoS/NSIL should approach IN-SPACe for consideration of waiver/subsidy on the applicability of the technology transfer costs and royalty on the defence industries which will be utilizing the niche technology/ services developed by DoS towards national security.

15. **Special Technologies** - The procedure enumerated to access special technologies such as launch vehicles/ satellites is aimed only at established industries. It does not provide any scope for potential start-ups.
16. **Validity of Licensing** - If TT is to be shared with other govt research verticals, validity of licensing need not be applied for applications towards enhancing national security. The model used by the European Space agency for this TT can be referred for more understanding and scope.
17. **Brokering Network-** We can come up with model such as a brokering network which will use external brokers who will work with ISRO to evangelize the technologies outside of the space sector.
18. A separate committee for Disruptive technologies is proposed.
19. Space weather should be a part of Space Communications and Services Committee.
20. **Continuation of Information Flow through ISRO Website-** As per the DOS TT Policy document (2021), Department of Space is for transferring technologies to the Indian enterprise and non-profits, in a non-exclusive mode. Such Technology Transfers are already done on a routine basis. As per ISRO website itself (2016 time frame), over 300 technologies have been transferred to Indian industries. To continue this effort, ISRO web site should periodically update the list of products for Technology Transfer and interested parties can approach ISRO as per the policy guidelines.
21. **Exploration of Other Possibilities.** Technology Transfer need not be confined only to hardware and software products. But it may be necessary to explore other possibilities. In this regard the following aspects can be considered:-

- (a) Sharing of technical knowledge and experience should be also taken into account. For example sharing of the knowledge of orbit-frequency coordination as per ITU RR is one such example.
- (b) Consultancy services to private companies should be also included in the Technology Transfer (TT).
- (c) Support to private companies for undertaking contract works like Assembly, Integration, Testing projects from foreign companies should be included under TT.
- (d) Availing ISRO infrastructure facilities and knowledge of ISRO personnel for development and related works should be included under TT. (Process of sharing the facilities even though it is included in INSAPCe activities)
- (e) Support to private industry to bid of international contracts. This is very much required as many of the international RFPs demand the bidder to have previous experience in full satellite building, launch and operations, etc, which the nascent Indian private industry lacks. But with support from ISRO/NSIL they can show requisite experience.

17. Collaboration Approach for TT.

- (a) Technology Development work can be identified right from conceptual stage and carried out jointly by ISRO and private actors. Example- State of the Art Satellite Bus Development for identified applications; Launch Vehicle Interfaces for multiple satellite launches.
- (b) Limit the number of TT partners' at least for the initial few years (for example say first 5 years) for business viability and sustenance.

18. **Contract Approach for TT** -ISRO can identify product which will be required by the Space Industry and issue contract to private companies for development of the Technology. This will also facilitate ISRO engineers to work with private companies. This is to involve private sector in generating new knowledge or technology necessary to solve a problem.

19. **Exchange of Resources Personnel for TT** - Deputation of ISRO engineers to work in private companies on joint development work. Similarly ISRO may allow personnel working in private companies to work in ISRO facilities.

20. **Consultancy Services**

(a) ISRO to provide Consultancy Services to private companies to support establishment of space based system to provide services.

(b) ISRO to provide Consultancy Services to private companies to support establishment of new facilities. (Process of establishing facilities).

(c) ISRO to provide Consultancy Services to private companies to support the development of new technologies.

21. China Model – Reputed companies in USA and Europe (ex. SpaceX/Tesla, Boeing, Airbus, etc.) transfer technology to Chinese Companies for large scale manufacturing. In this regard, Chinese Companies must be getting help and support from their Government. This type of approaches needs to be studied for adaptation.

22. **Role Definition.** It would be helpful to get more clarity if the respective roles of NSIL, ISRO, DoS and IN-SPACe are clearly brought out. What is the status of TT that already took place through Antrix and Technology Transfer and Industrial Cooperation cell of DoS. What is the role of Antix? It would be helpful if the mandate and composition of Centralized Technology Transfer Committee is also given. To whom does it report to?

23. **Grievances and Dispute Resolution-** The grievances and dispute resolution mechanisms needs to be included for completeness sake.

24. **Development of Capabilities of Private Industry as a strategic goal of TT Policy-** The strength of the nation also critically depends on the strength and capabilities of the private industry in high-tech sectors. In Section 1 and Section 3 of the Draft TT document, the development of capabilities of private industry as a strategic goal can be included by adding the word 'strategic' along with economic, societal and eco-development.