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YS Rajan

~~PROF S. Dhawan~~

~~7/11 PALACE CROSS~~ ROAD

~~Bangalore 560020~~

1990

~~RAMAN RESEARCH INSTITU~~TE

B~~ANGALORE - 560 080. IND~~IA

PERSONAL

To: Prof. S. Dhawan

From: Y S Rajan

14-1-90

PERSONAL

New Delhi
14-1-90

My dear Prof. Dhawan:

Pongal greetings.

Please pardon me for sharing a deep personal pain with you. I understand that Prof. U.R. Rao (because probably he has been informed by some interested element in Delhi) believes that I have instigated Sh Seshan to raise the question on INSAT-II! He is telling so many persons that I spend 60% of my time in Planning Commission and so on. He might have told you too . . . Sh Seshan is fully ~~capabl~~ capable of dealing with his papers and take his views on any matter.

The only time I wrote suo motto on various worries on own Space programme including INSAT-II, was in ~~eat~~ early Oct 1989 to you — a long personal letter. It also mentioned about the happening in S&T community, E. Europe, etc. But I am not the person to take up a crusade: may be I am pragmatic or a weakling!

It is not that ~~I~~ I don't care. I know that I am nothing in the pantheon of the official Space hierarchy.... Only unfortunate thing is that I have to live long to watch the decay.. may be occassionally I will write a letter or two to you. ... may be sometime share the sorrow with one or two personal friends in ~~Sp~~ ISRO...

What pains me is that the 'ISRO politics' and unfortunately very recently the 'S&T politics' has plunged to worst personal levels. ~~and~~ People have started feeding 'disinformation' and 'misinformation' from official levels.

Persons who used to seek favours to Sh Seshan and try to hang around him, have left him for better pastures.. I had seen such ~~[illegible]~~ a phenomenon around Siddarth. (So many 'scientists' queing to 'see him' when he was Secretary SAC-PM and later not even talking to him..) I maintain my personal relationship with Sh Seshan, Siddarth or Ashok Parthasarathy, just as I ~~[illegible]~~ maintain with a few others. I am neither a saint nor a recluse. Their ups or downs or their views on matters are immaterial to personal friendship. I have seen Sh Seshan a few times after he became Member P.C. 'Not-the-60%-of-my time'-canard! Total time in two weeks would be around an hour! Mostly planning the acquisition of books/reports in his empty room.

At least earlier, we used to share some ~~exchange~~ ~~to~~ general info. — RRSSC, or satellites or retirement of some persons like Kumup, etc. In fact he used to have more information! .. Now the situation is somewhat sombre.

But I feel it is immoral to cut off personal relationships and 'tag on' only to those who are officially powerful... If one is misunderstood, probably it is to be considered as bad luck...

Another thing -- I did not join DST or Dr. Gowariker to work against Prof U. R. Rao. Nor am I doing anything against Prof U.R. Rao (He does it himself!). You know the circumstances under which I left ISRO -- I had no other option. Unfortunately, I have a wife and two sons to support and possess no property or wealth.

I have to earn my bread! ... Nehru inspired me to get into S&T .. I had some excellent period with Dr. Sarabhai, you & Dr. Prakash ... I cannot now get out of S&T, which has moved over fully to small-time operators. I wish I can! .. Even amidst this gloomy picture, I have been able to make some very useful work in TIFAC, with socio-economic Ministries, Environment, Survey of India, etc. - especially in energising some existing persons, linking them, etc. Some of these successes might be breeding ~~jea~~ jealousies!

Probably the present S&T bosses like Prof U.R. Rao and their hangers-on would like to see me as a 'hunting dog' on their side

~~on~~ or as an 'active' puppy somewhere,
(if not with them.). I am neither.
I am a human being with some
attachment to values; I still believe
S&T can help Indian people and
therefore work for it. (Though I feel
frustrated with 'pettiness', I still
work hard and am active.. I cannot
be a retired person while earning money!)
I cannot also resign to a, totally phlegmatic & vegetative
existence though I am 'pragmatic'.
With Prof. U. R. Rao's paranoia
with anybody who asks him a question
(or with persons whom he thinks may not toe his line!')
and with Dr. (Smt) Manju Sharma's
desire (and opportunity) to become the
S&T ~~czaris~~ ~~Cz~~ czarina, they seem
to have started a 'muck-racking'
on many persons: an "IAS" Seshan
can take care of himself! They
don't know perhaps that I have no
desire to become an S&T czar or
Secretary to GOI, & the level of it
being what it is now! Sometimes, it

makes me wonder whether I am a force to reckon with ... may be the long 'tenure' I had under you has made me something !! - - -

I could have met you today; but I did not want somebody to link my meeting you with some 'lobbying'! Hence this private letter! (In actual reality I would have felt greatly relieved if I had met you personally - - - -)

-- Before closing something good! (technical!) ~~Dr~~ Sh. L. C. Jain Member P.C. has asked Sh Seshan to arrange for a presentation on use of remote sensing, maps, GIS, etc. Asked some colleagues in DST, NISSTADS etc to do it. An excellent interactive discussions with ~~M~~ Members. Hope it can lead to a useful programme for fructifying State S&T Councils, State remote sensing

Centres, NNRMS, NRDMS (of DST), Survey of India, FSI, etc — and helping decentralised planning.

The observations you made regarding NICNET — overcentralised information and its non-utility to the local planners, was pointed out by a few Members.... fortunately given the remote sensing based natural resource data maps, other statistical data, Survey of India's recent works on Districts, NRDMS's work at Village as unit type District GIS system (uses remote sensing derived maps from State Centres & NRSA etc): all now poised together. The seeding of the idea had taken place a few years ago when you had told me to explain remote sensing to Sh L. C. Jain... It has registered & its working now!...

I will brief you later.

With kind Regards

Ra[illegible]
14/1/90

URGENT

Confidential

Personal

To

Prof. S. DHAWAN

7/11, Palace Cross Road

Bangalore - 560002

From

J. S. Rajan

D-II/53

Kidwainagar (west)

New Delhi - 110023

Y.S. RAJAN

No.TIFAC/2/90 March 13,1990

My dear Prof. Dhawan,

This letter is all about TIFAC. Though I have talked to you a few times on many of the activities, here I attempt to have all of it together.

2. Many of the activities initiated by TIFAC have started yielding some good results. I am enclosing herewith a number of reports and documents - some of which are in draft form. They will give you some idea of what is happening.

3. I will make a brief comment about each of the document in the following paragraphs of this letter. I will also describe briefly how the studies were done, the constraints, etc. I request you to peruse them and give your (valuable) critical comments on each of them. I have <u>not</u> arranged the documents in a pure chronological order. I have tried to maintain a subject continuity.

4. While I am sending this letter mainly to keep you informed of TIFAC activities, it will also serve me to take "stock" of TIFAC activities since I joined it (July 1988).

5. The very first document brought out by TIFAC is Document # 1 describing about TIFAC. You will find a brief description of the objectives of TIFAC (the "language" of objectives,etc., is "lifted" from the Government documents approving TIFAC.) Interpreting them in a broader context, the Council narrowed down a few areas in which TIFAC should concentrate. Even this list is very large. It was arrived at after informal discussions with a large

number of persons and also the then SAC to PM. The list contains certain areas where large value/volume technologies are involved; some having a greater social relevance; and so on.

6. It was concluded in the Council meeting that atleast initially TIFAC cannot be giving a Technology Status report - covering all technologies available or relevant for the country. That is why it would be noticed that first Annual Report of TIFAC -Document # 2 - addresses only activities of TIFAC.

7. It will be noticed from Documents #1 & # 2 that the Council gave a lot of importance to the creation of a Data Base/Information System on Technologies. The documents addressing the Information Systems are:-

Document # 3	TIFACLINE (Doc.No.0.011/TIFAC/30)
Document # 4	Flip Chart
Document # 5	Guidelines for recording information in TIFACLINE information Database (Doc.No.0.007/TIFAC/89)
Document # 6	TIFACLINE - Networked Technology Information.

8. I am not enclosing a large number of working level documentation on TIFACLINE used for Expert Reviews (we were fortunate that persons like Dr. K.S.Prabhu, Dr. N. Ramani, Dr. T.Viswanathan also reviewed various aspects of TIFACLINE).

9. We had planned a Technical demonstration around mid-1990. It may get delayed for a variety of reasons. I am particularly concerned with the quality of Data Entry (how updated and technically sound each entry is) and the Expertsline (the real

quality of experts) - software problems while difficult & complex can be resolved, I have requested some persons to oversee the Data Entry.

10. One major problem is the degree of interest and motivation of technical teams in the laboratories. They are the right people to do the work (SAIL (R&D), TERI, BARC, NAL, DMRL,etc.) They have the necessary peer groups too. At the top level of the laboratories they have given good commitment to the Project. But the actual infrastructure and organisational support given by the laboratories to the one or two information Scientists (who directly work on this project) are poor. For example to fill in and review the contents of Document # 5, a large number of technical persons from the laboratories would need to be involved. Despite many requests, in actuality the involvement of other technical persons from the laboratories is not adequate. "What do I get out of it?" seems to be unasked question in their minds - the <u>classic conflict of interest</u> between the Project and divisions, in a situation where we <u>cannot</u> have even a direct control. But we are <u>not</u> giving up the efforts - we are trying a variety of methods to enthuse the laboratory personnel to do the work on the project - including the provision of a PC which is the Data producer terminal. Some wait for work till the PC arrives, even though the Doc. # 5 can be filled up without any of it. I will send more information on TIFACLINE as we have a better progress.

11. One interesting item which was initiated on TIFACLINE is a professional market survey by a competent Consultant Group. Since it is difficult to "market" <u>a knowledge-based product</u> like Technology Information, we had waited for such a survey till some

work on the pilot experiement progressed, so that something to show will be available. The survey is near-completion. I am enclosing herewith a draft interim report; even in this form it will give you some idea about the final findings of the survey (Document # 7) We will go through various reviews of this survey as well as the status of TIFACLINE to effect appropriate mid-course corrections. <u>I would be grateful if you can give your considered views - atleast as points - on the TIFACLINE as a whole as well as other details about TIFACLINE.</u>. It will help us in shaping it properly.

12. Now I will turn to Technology Forecasting & Technology Assessment activities. It would have been ideal to give each area to an Expert Group - with a highly capable technical leader guiding them. Each member of the team should devote atleast 50% of their time to the Technology Forecasting & Assessment activities besides their other technical/professional activities. The team members should have an access to information on the international status of technologies, status in India (including industry), commercial/economic data, etc. The foremost problem is to get a team of 4 or 5 professionals who are together. Not many seem to be willing to devote time to collect and assimilate large amount data on the subjects. Most of them are ready to give general suggestions on the direction to go - mostly on an impressionistic basis. Matching their suggestions with the ground realities of Indian industry is a big problem. Part of the reason why many technical professionals behave like this is because they seem to have lost the faith in the ability of the system (over the past few decades) to take <u>technology planning seriously</u>. "We have told so many things .... so many times ....still massive imports of turn key projects are taking place, that too of obsolete/incorrect

technologies - what is the use of another study ?" This is the reaction from most of the persons.

13. Another problem is that most of the experts are busy elsewhere and there is no mechanism for TIFAC to bring them for periods of one or two years with sufficient incentives (monetary and otherwise) to work for TIFAC. (After about 1,1/2 year of chase-up we just now have Prof. R.S.Ganapathy, from IIM (with TIFAC) on a SAIL project and another competent middle-level engineer from SAIL, Ranchi - again paid by SAIL - on loan to TIFAC.

14. But we have not yet found a system to do regular TF/TA studies - on a continuing updated basis. A number of experiments have been done which provide some clues as to what can be attempted in the future. I am also aware that it takes years to stabilise a group like that of Prof. Amulya Reddy. But we have compulsions to do things fast.

15. We have explored fully the strengths of existing Ministries/Departments. The Scientific & Technical Advisory Committees (STACs) in the socio-economic Ministries have started their activities over the past two or three years. Except for a few of them which have been functioning very well earlier, most of these STACs function as mere Committees which meet once-in-a-year-or-so, or act as a body to decide on a few R&D Projects. None of them, even the best amongst the STACs, have come up to the role of Advance Technology Planning (which is what TF/TA are about.) However, some of the STACs have produced a few good documents about R&D going on in their Ministries. DST has the responsibility to coordinte amongst STACs through a mechanism called Inter Sectoral - STAC called IS-

STAC. A Scientist from DST is responsible for it and we from TIFAC work closely with them. In a number of STACs besides a DST representative, there is also a TIFAC representative. We have decided not to have a seperate sectoral TIFA's in various Ministries (see Doc.# 1) and are using the existing STACs as a Sectoral TIFA. We are requesting the Ministries/Departments to provide funds under their control in their Departments/Ministries to support TF/TA/TIFACLINE work. About 10 of them have done so.

16. The two documents (brought out by DST) on STACs will give some idea about STACS.

DOCUMENT # 8 : Compendium of STAC's Activities in Socio-Economic Ministries (Vol.I)

DOCUMENT # 9 : - do - (Vol.II)

17. TIFAC took the initiative of approaching all Ministries/Public Sector agencies to give us documents about their Technology Plans (even those reports which have not been acted upon). Fortunately after a constant chase of a year we got response from about 80% of the organisations (about 150 documents). Since most of these documents are bulky and not always well written, TIFAC has brought out a summary of all these reports under 14 broad headings:

(1) Agriculture
(2) Chemicals and Petrochemicals.
(3) Education
(4) Electronics.
(5) Energry
(6) Housing
(7) Instrumentation
(8) Metal
(9) Non-metal.
(10) Technology upgradation/transfer

(11) Telecommunications
(12) Textile
(13) Transportation
(14) Waste Treatment

All of them are in the press. The documents which have already come out are enclosed:

Document # 10	Agriculture (TIFAC.SP.001)
Document # 11	Chemicals&Petrochemicals (TIFAC.SP.002)
Document # 12	Education(TIFAC.SP.003)
Document # 13	Electronics (TIFAC.SP.004)
Document # 14	Energy (TIFAC.SP.005)
Document # 15	Housing (TIFAC.SP.006)
Document # 16	Instrumentation (TIFAC.SP.007)

(As others come out of the press I will send them to you.)

Those interested in seeing the original documents have to contact TIFAC.

18. These documents are being circulated widely to various technical groups. When technology forecasting and assessment exercises are done, these documents can be useful inputs to know some "ground realities".

19. In the field of Forecasting we utilised the study done by IPCL - IIM (the study was underway when TIFAC started). TIFAC Council considered the outcome of the study (presented by Dr. S.Ganguly, the then Chairman of IPCL). While endorsing the findings of the study, the Council decided that we have to come up with some specifics which can be recommended to the Government, Industry and R&D Labs for action. This principle introduced by the Council was important: "Don't stop at Forecasting & Assessment. See the ground realities and suggest some items for specific action in the Indian context."

Document # 17 Technology Planning for Petro-chemicals - is the IPCL-IIM

Study.

Document # 18 A Report on Technological developments related to Petrochemical Industry in the area of Naptha/ Gas Cracker, Polyolefins,Aromatics (Ref.No.TIFAC:P:003)- is the specific recommendtions of TIFAC.

We hope to ensure that these recommendations are followed. It can be done only by persuasion. Chairman TIFAC is writing to Ministries, talking to them, etc., also with Industry. Let us see what happens.

20. Another study initiated by TIFAC relates to the Human Settlement related Technologies. Summaries of the seven reports along with a copy each of the seven reports are enclosed.

Summaries of the reports	Report
1. Document # 19 (TIFAC No.HS/1/90)	1. Doc. # 26 (Guided Urban Development)
2. Document # 20 (TIFAC No.HS/2/90)	2. Doc. # 27 (Technology Aspects of Low Rise High Density Developments for Different Types of Human Settlements.)
3. Document # 21 (TIFAC No.HS/3/90)	3. Doc. # 28 (Low Cost Infrastructure for different types of Human Settlements- Roads)
4. Document # 22 (TIFAC No.HS/4/90)	4. Doc. # 29 (Low Cost Infrastructure Water Supply, Sewerage and Drainage)
5. Document # 23 (TIFAC No.HS/5/90)	5. Doc. # 30 (A Model Framework for Technological options in shelter construction)
6. Document # 24 (TIFAC No.HS/6/90)	6. Doc. # 31 (Technical Aspects for facilitating adoption of new techno-

logies and innovations in the Human Settlement Sector)

7. Document # 25 (TIFAC NO.HS/7/90)	7. Doc. # 32 (Administrative aspects for facilitating adoption of new technologies and innovations).

The rural scene is not addressed. It is more relevant to the organised sector. While there are several useful clues/suggestions, they are not the best yet. The Council has to consider them to go forward further. The Report on "Building Materials & Skills" is yet to be received.

A study on Sugar Industry is also to be finalised in about a month.

21. Regarding Steel we have initiated 14 studies to define (Forecast-cum-Assessment-cum-Action Plan) what the country should do beyond 1995 after SAIL,TISCO modernisation is complete. The fourteen studies are:

a. Iron ore upgradation to reduce alumina and utilisation of fines in sinter.

b. Economic reduction of ash in coal while conserving the scarce coking coal material

c. Coke rate reduction in blast furnace.

d. Continuous / Direct Steel Making

e. Alternate routes of iron making

f. Energy recovery systems including hot-gas clean up.

g. Simulator cum pilot plant for continuous casting.

h. Design and operation of drives for conservation of Electrical Energy

i. Development of refractories and insulating materials to reduce thermal losses.

j. Development of ladle metallurgy to produce clean steels with consistent chemistry.

k. Dephosphorisation of steel.

l. Thermo-magnetic treatment of steel to produce the desired properties.

m. Direct strip casting for amorphous iron-silicon transformer core-material.

n. Integrated control system for conservation of energy, increase productivity and improve source utilisation.

It will take about three months more to complete the reports.

22. Regarding TITANIUM, which the Council has also identified as an important item in the Indian material technology scene (based on presentation), nothing specially new was to be done since over the past five years DMRL, Deptt of Mines, DAE etc. have been studying the matter. What was needed was to put together various inputs in a simple readable form explaining the role of Titanium, Cost-effectiveness, where it can be applied etc. A first cut draft is placed as Doc. # 33 (Titanium - An Overview and Strategy for production in India.)

23. While considering Materials Technologies, it was found that it is not enough to talk of future without looking at some of the actual realities of the Indian scene. Foundries are languishing and most of them have not kept pace with modern developments. So TIFAC studied "Foundry modernisation". We studied the issues alongwith DMRL/CEI/Foundry Industry. What was to be done to modernise is generally known. But there are no

"numbers" to decide on certain course of action.

A preliminary document is : Modernisation of Foundries - Status and a plan for Action. (Doc. # 34)

During April we will have the last round of meeting and finalise our report.

24. A set of joint (TIFAC/DOE) studies on Electronics Materials is yet to take off.

25. Yet another important set of studies based on a DGTD presentation relates to the following :

i. Various suggestions emerged during the TIFAC meeting. These include introductions of openness in decision making, methods of technology planning in a few areas of Indian industry which have reached International levels of volumes etc. These suggestions and refinements thereon will be documented by TIFAC/DGTD. The document will be submitted to Chairman TIFAC. He will send it to important decision makers in Govt. (Cabinet Secretariat, PMO, Ministry of Industry, major industrial houses etc.) highlighting areas of action.

ii. The list of industries in chemical, electronics, telecommunication, materials technology etc. where special efforts should be made to reach international standards of productivity and efficiency, may be drawn up. Technology inputs needed for these industries may be arrived at through an intra-industry study and discussions. There could be a series of workshops to have a larger open participation. The action plans should also include where we should develop key centres of excellence in the country to achieve technological eminence. Interim measures to be taken by Govt. ensure that the formation of such integrated programmes are not bypassed, should also be indicated.

iii. The above action plan should be put together and sent to all concerned for action and important Govt. agencies for providing an enabling environment.

iv. A rough time schedule for (i) above was end October, 1989 and for (ii) and (iii) by end December, 1989.

These can form a good basis for some basic decision. DGTD needed some time to start work. We will try to bring out these reports in about three months. Copy of the DGTD presentation is enclosed as Document # 35.

26. Another matter concerns Utilisation of Coal. Based on a presentation TIFAC has concluded on certain broad aspects. These will be expanded further for specific actions. The presentation material and the TIFAC conclusions can be seen in the Document # 36.

27. Another useful set of studies relates to the experience of other countries in TF/TA/Important System and decision making based on these; also a manual for TF/TA. Five studies were entrusted to Dr Bowonder of ASCI :

i. Use of Technological forecasting in decision making in selected countries : Lessons for India. (TF/TA/FS (future studies) 4 out of Japan, South Korea, Sweden, France, UK, Poland, West Germany.

ii. Detailed trend Studies on long term tehnology development strategies in selected sectors, micro-electronics/ biotechnology / machine tools/ good products, etc.

iii. Preparation of a Manual on Technology Forecasting techniques and case studies.

iv. Preparation of a Manual on Technology Assessment techniques and case studies.

v. Technology Monitoring through Survey of technology forecasts.

Copies of two reports which have come are enclosed :

Doc. # 37: Study No. I - Technological Decision Making

Doc. # 38: Study No.II - Technology Development

It is planned to present the Results of all these five studies to a group of 100 persons. We hope to come out with some consensus on the lessons to be learnt for India and the mechanisms for continuing studies.

28. In addition to the above, we do give information/advice/inputs to Deptt of Industry, BICP, etc.

30. I would have personally liked to see more things to happen. But there seems to be a major limitation "Indian-rate-of-interaction" - which is of the order of 10 to 12 months not weeks! (After all the detailed discussions, things start moving only after 10 to 12 months - too long a start-up phase). May be it is good for stability!

29. We are also ~~explaining~~ exploring the possibility of some young professionals doing the TF/TA studies. We advertised in the newspapers. After screening the reponses we have ~~manouvered~~ narrowed down to a few groups for acertain studies. These cover the following areas :

- Post-harvest Technology
- Sugar Industry
- Instrumentation Technology
- Capital Goods - Automated machinery and Production System - Robotics
- Energy - Bio-mass Production/Utilisation
- Packaging Technology
- Water Treatment Technology
- Material Technologies - Foundry Industries
- Cryogenic Technologies

- Bio-technology - Monoclonal antibodies
  - Enzymes
- Agriculture - Biofertilisers
  - Food Processing Technologies
- New Materials Technologies
- Transportation

If we can find out some good groups (judged by the outcome of the studies) we can nurture them to become TF/TA study groups. They can also help other Ministries / Departments to look at their areas of interest, thus enabling "TF/TA Groups" to emerge in the socio-economic Ministries.

31. The S&T Deptts do not see any special need to do systematic TF/TA studies. They feel that planning done for their Department's activities would suffice. For the present, we are not pressing them much. You are aware that ISRO's decade profile does not address technology development plan. You had asked ISAC earlier to come up with Technology Choices for Satellite Technologies - "Do we stick to Aluminium Alloys alone? Or go towards composites etc."? No such plan was brought out by ISAC. Probably if we had done some serious TF/TA work on Ground Systems, we might have got into that business in a more serious way. ...Any way for the present we are not pursuing with the big S&T Departments except for the help by BARC for TIFACLINE's Nuclear Technology Data Base.

32. On SATCOM related technologies we had initiated some work with DOT, But we are presently going slow.

33. Similarly , we had planned a serious study on the Aviation related technologies to be conducted by the TCS Group (Prof Murthy) with the overall guidance of Prof R Narasimha -

but there was some dislocation due to Prof R Narasimha's movement abroad. We will pick it up. Prof R Narasimha is in touch again on the matter.

34. We had also planned to study some Technologies Assessment Studies with BEL and HMT on Automation - has been slow to pick off.

35. There are some other studies at the definitional stages - more on them later.

36. TIFAC extended special support to a Committee studying "S&T investments during the Eighth Plan by Industries". I am enclosing an interim draft which will give an idea of the matter. Document # 39.

37. TIFAC had an empirical study done through NISTADS about the linkages between various S&T institutions in the country.

Doc. # 40	A study on linkages of Research Institutions with Academic Institutions and Industrial Organisations. (Ref. No.NISTADS-REP-72(TD)/89-Vol.I
Doc. # 41	----------do-------------- (Vol.II)

A study as to what happened from NCST to TIFAC is underway. A preliminary draft is enclosed. (Document # 42).

38. To fill the gap in the knowledge about the world status on commercialisation/commercialisability of emerging technology TIFAC has started building up a specialised library. Soon the TF/TA groups have to use these and develop an Indian scenario. I am enclosing a typical list of the documents (Doc.43).

39. I have taken the liberty of flooding you with all these

documents. I do not want to claim that all of them are of excellent quality. But these would give you a total picture. I will value your advice.

40. You would find an absence of work on the Energy sector except for a study on Coal. It is a complex matter. We would identify a good group which can work under the guidance of Shri T R Satishchandran.

41. A word about the mechanisms to implement the recommendations resulting from TIFAC studies. The earlier SAC to PM had a special Empowered Group chaired by the Cabinet Secretary to implement its recommendations. I am not aware of any major change in Industrial Policy or a technology pertaining to a major industry being implemented partly because "the end-to-end-to-chain" in the recommendations were missing. As far as TIFAC is concerned, it is not in any "approval-giving-loop". Therefore its recommendations can only work as "advice". Since in many industries, we are still obsolete in technologies and working methods, it may be premature to make them work on "beyond the horizon" technologies. (As you used to say "Engineering is a step - by - step process", I find that unless they realise some of the existing "technological know-how backwardness" and solve them, to introduce brand new technology may not be possible.....). We hope to experiment many methods ..let us see the results and learn. We are also deeply aware that the whole MITI took 20 years to come out as a force. But people expect TIFAC to yield results almost instantly. Chairman TIFAC is fully aware of this matter and he would not like to rush just to show something.

42. Based on suggestions from a number of persons, we were

also planning to do a major TF/TA study with Arthur D Little or Beattle...Till things stabilise here in New Delhi, we do not plan to initate anything now on these lines, though it would have been a useful exercise in making many of our S&T groups aware of the methodologies used by them.

43. I plan to meet you after two or three weeks to get the benefit of your advice.

(Y S RAJAN)

Prof S Dhawan,
7/11, Palace Cross Road,
Bangalore 560002

PERSONAL

For Prof. Dhawan's eyes only

22/8/90

Performance of MAKM as MOS(S&T) on TIFAC

c/o Prof. S. Dhawan
Indian Space Research Organisation
New B.E.L Road
BANGALORE-560064

From:
Y. S. Rajan

Personal

My dear Prof. Dhawan:

Whether you like it or not I will continue to share my joy or sorrow with you. (I sincerely thank God that I have such an opportunity — an extremely rare one in this dreary land of ours).

I enclose herewith a copy of a letter or note from Prof. Menon. I will take action as a routine duty. This note comes despite a recent review along with the Council & so on. No need to bother you with hundreds of details ... you can see the "ultimateness of the Clericalisation of 'science' in this country". Many tall talks of vision, freedom, flexibility ... I know why this was written: due to a voracious appetite to 'control' which for such men can be done only by petty administrative — of budget, personnel, etc.

The discipline taught by you

and Dr. Brahm Prakash is very much with ~~you~~ me. But somehow both of you have never encouraged demeaning servitude; it is not in my grain either. So I work hard, show respect, etc as a reasonable, rational individual. But that is not enough: there are now tens of top 'scientists' who resort to servitude to the 'persona'.. I don't do it.. Nor Dr. V. Krishnamoorthy..

The desire for 'control' and demand of 'servility' is perhaps two orders of magnitude more than that of Prof U. R. Rao...

I will continue to do my tasks in the best of the traditions I have been brought up... I have the courage and the mental fortitude. The desire for holding 'positions' — especially within the S&T community —

had disappeared long ago; I had explained to you my reasons & the mental state. But the "Be ye the lamp unto thyself..." is still very much there; I don't think the lamp can be put out that easily: it will end, perhaps, with the end of this material body...

I don't want you to worry about this nor do I expect any action.. just to keep you informed; to share the agony... the eternal bonds remain...

With regards & respects

Yours affectionately

Raja

New Delhi

22-8-90

MINISTER OF STATE FOR SCIENCE & TECHNOLOGY

Principal Secretary to Prime Minister had desired that a review be conducted concerning the progress of TIFAC. A meeting of TIFAC was held on July 16, 1990 which was essentially meant to present a status report on TIFAC and obtain the comments of the members present. On August 3, 1990 a copy of the minutes of the 13th TIFAC Council meeting held on July 16, 1990 were sent. I had asked my PS to obtain a short executive summary of these minutes which could be forwarded to PMO on an interim basis: I also desired to have information on various items and actions taken, in respect of the points I had raised at the meeting. I intend to take a review of TIFAC with Chairman TIFAC, Secretary DST and yourself shortly. I would like for this, all the documentation so far brought out by TIFAC and the extent to which it has been distributed/made use of, etc. With regard to various activities, I would also like to see explicit target dates set/achieved. I had earlier asked for a list of staff employed by TIFAC with details of qualifications, experience, dates of appointment; as also of Consultants since TIFAC was constituted; in the case of latter, I would like to know what were the tasks assigned to them for which they were appointed and which of these have been accomplished.

I would like to have the above in a week's time so that the review meeting can be held at an early date thereafter.

MGK Menon

(M.G.K. MENON)
August 11 , 1990

D.MOS(S&T)/90-798
13/8/90

Shri Y.S. Rajan
Adviser DST
Executive Director &
Member Secretary, TIFAC

Recd 20/8/90
5pm

17/1/91

Prof. S. Dhawan
7/11 Palace Cross Road
Bangalore - 560001

About absorption into DST

From

YS Rajan
D11/53 Kidwai Nagar West
New Delhi - 110023.

ORIPURAM ★ ALORE

BANGALORE CIT

New Delhi
17-1-1991

My dear Prof. Dhawan:

You might have received ~~some~~ of my earlier letters, brief notes, etc. I could only talk to you on phone and meet once ~~at~~ the Airport. I hope I will be able to see you sometime and talk for a couple of hours. I had been very busy with many works of TIFAC (many useful reports are coming out; also TIFACLINE, information system is taking shape)... also some other works related to Survey of India (what you used to describe as 'mission').. I hope to brief about them all, when I meet you..

This letter is to ~~brief of~~ inform you that the formalities of my absorption in DST have all been completed. The final approval from ACC has just come. In a way it is a happy moment because the step taken for a change has been formalised without being in an administrative 'limbo' of deputation.... my higher grade (Rs. 7300-7600) has also been formalised (among other things, this was made possible by the extraordinary step you took to give me 'G' grade earlier than 5 years; and subsequent step while joining was done by Dr. Gowariker of processing my induction into this grade without me asking for it nor him telling me that he is doing it)..

In a way, one can

say like the old Indian adage "all is well that ends well". I should however share with you that this happy day also symbolises of my not being formally an ISRO person — ~~[illegible]~~ an association symbolised by Vikram Sarabhai, yourselves, Dr. Brahm Prakash, and many other hardworking and loving colleagues... but 'ISRO' in me will remain just as my 'remnant' in the ISRO ensemble....

I will continue my work in DST/TIFAC to the best of my capability. I seek your blessings, again as I took it before 'applying' for DST, etc. I will continue to seek your guidance,

share my agonies & joys, ---
I pray for your health and
long life. I hope during 1991
you will bring out a few more
monographs like the 'BIRD ~~EH~~ FLIGHTS'.
You should write one on ISRO
— as I had been pleading with
you — even if it were to be
published only after decades.

Every one in the family
is fine.

My regards and respects
to you & Mrs. Dhawan

Yours,

Raj

17/1/91.

Personal / Confidential

New Delhi
22-2-94

My dear Prof. Dhawan:

I know that I have no right to request you to read a long letter, especially one written in anguish; written to unload some pain which arises out of seeing some terrible things that happen day-in-and day-out. At systemic level; also some at micro level.. It is about 20 years since you picked me to join ISRO HQ (Feb 74 at Bombay Centaur Hotel, when I met you first). As a young and irreverent person, I told you (after hearing you) "Sir; I hear ISROHQ is a morgue"... You were magnanimous to say "Well.. it depends.." then you went on to say other things. My life took a different direction not a "line-man" but a staff (P.T.O)

I enjoyed what I did it. I think I played a no ~~is~~ insignificant role in making systems, some of it last even today, despite the bashings they have taken. But the formal peer world, as I always used to tell you as "Writing on the Wall" would look at me as a mere paper-boy, (though as Directors they attend meetings only!) I would be looked at no better than a Lav-kare, Manju Sharma, K V Swaminathan or a MG Chandrasekhar. (Even MGC may become Director ISAC ½ and therefore an eminent scientist — IAS, INSA fellow etc!) ... However Manju Sharma is the greatest biotechnologist, thanks to Prof M.G.K. Menon! (MS Swaminathan et al) Things were in the air in 1976 itself ... ~~?~~ That is why I used to mention about this "Writing on the Wall" when Chairman ISRO gave SITE & Aryabhata awards to scientists (direct contributors) and support staff — Both SAC and ISSP had given my name in <u>support services</u>. In the SAC document on SITE persons, Y.S. Rajan does <u>not</u> figure — for a person who, among other things wrote the first Operations Plan for SITE... In satellite technology YS Rajan won't figure at all, despite the fact that from Hi Rel part to Test Plan to System Engg on Aryabhata, my <u>technical</u> contributions were of no mean order, in 1973-75 level...

Even on remote sensing, my name is wiped out except for the International Journal of Remote Sensing in which I am an active Editorial Board Member... When it was for Director NRSA, I remember your telling me <u>suo motto</u> "Rajan, you will fit in well, but who will takes care of integration of

of SAC, NRSA, IRS etc?"
I did not even get ~~a let~~
a 'thank you' letter when I
was dropped out of NRSA
Governing Body (after two or three
terms) in 1989! All ISRo/DOS
documents on NNRMS, State Govt.
Remote Sensing etc, giving historical
background do not even recognise
the existence of YSR, who saw
it through.... Similarly had I
been allowed to be Director DEAL
in 1982, I would have been
considered a great man for
electronics, communication, ~~and~~
remote sensing and image processing.
(Incidentally Ved was considered
along with Dr. P. Rama Rao etc

for being Secretary DST. Dr. Rama Rao among other things had an advantage of being DMRL Director since 1982!) ... Ved is competent; I wishes him well: I hope he succeeds Kalam!

You are fully aware of the circumstances under which I left ISRO, not as a proud man who contributed tremendously to an organisational system, to its forward planning, to its linkages, etc, but a sad man who could not stomach how such a unitary system can also easily lend itself to an arbitrary running.; An ISRO which cannot even give a reasonable position to my services! ⊗ If ISRO were organised as CSIR we could have easily 30-odd Directors — at least satisfying 30-odd ~~pers~~ competent persons. But

⊗ Also I was marked as a Dhawan-man by URR who has manages to reward all his ISSP-men and INSAT-1 (Ford-type-friends!)

for the sake of programme we lived with about half-a-dozen. So many good persons are bottled when those who sit on these systems look at it as a power-game!

... Among so many things that were happening inside me and around me, one painful thing that <u>hit</u> me was a call from Vasagam, with two or three word Tamil expression; he has to plan to leave; so he needs to talk to me. Kale as VSSC Director has hit the technical pride of so many VSSC'ians. URR; Kale; ~~D~~ D. Narayanamoorthy trio would suffice now to save everything!...

Even in ISRO over a period, I come to an empirical conclusion that organisational indiscipline rewards a person... Organisational person gets 'screwed'!

On TIFAC, I have carried the cross — my shoulders are unfortunately strong - with a staff of 4 to 5, with so much politics around (including one-time active witch hunting by Prof MGK), it has made a mark professionally, with equivalent international systems to some extent and major projects have been started. I ~~I~~ am happy about it. Again the credit will go ~~to~~ to DRDO, ~~CDM~~ NAL, CSIO, CLRI, CII, ~~etc~~ Mission Directors, Ministries etc. It is another thankless job like NNRMS, but nationally beneficial one. I am ~~doing~~ doing so many other useful things for Survey of India, IMD, etc as well - another series of thankless work. But I knew, I know, how systems are seen ~~are~~ or evaluated...

If things don't suit the personal whims and fancies of eminent, top, (archaelogical layers of) scientists at a given point of time, everything or anything is bad. They don't care for gestation periods, or systems.. Everybody (top ones) is ~~are~~ angling for power, proximity to power, access to funds, foreign tours etc. Each of them have planted their hangars-on ~~to~~ in the system to take care of them... It is a groupism worse than what exists in the political parties... Some of those who cannot make it inside also develop special linkages with foreigners, in embassies etc to get a post-retirement benefit. ~~Even~~ It is a sight to see how high & mighty S&T big wigs (retired or otherwise) kow-tow with USA Counsellors, ~~etc~~ UNDP Resident Reps, etc.

Presently high pressure lobby is being mounted to have an Apex body of top scientists — a power-lolly-pops to a few selected ones! I had to unfortunately 'process' papers! Oh! God! What a fine difference between officials and non-officials in scientists. A clever play to keep hundreds of competent persons in

BARC, ISRO, DRDO, RDSO etc out of race. So universities and CSIR laboratories! INSA awardees! etc etc. You have to invent among IISc, CSIR Directors etc the greatest Information Technologists, Manufacturing giants, GATT/IPR experts, and so on. They will set the agenda for Science for the nation.... Another tamasha which IAS and Businessmen can watch and on the other hand kill even existing working level technological bases in the country to vanish.... If people of my tribe "System Persons" are treated as palace eunuchs, engineers/technologists are the out-castes of the system. ~~A~~ A Dr. N. Ramani who played around Monte-Carlo ~~system~~ calculations for you, or a Sridharan Dhas or a Nair of Structures ISAC ~~are~~ is irrelevant. There are dozens of persons from I.I.Sc. etc who ~~the~~ get INSA fellowship/ /awards or Bhatnagar Awards for Monte-carlo calculation or linear analysis. They form members of apex bodies — talk of national priorities etc. People like Siddhartha or me, who know the intricacies international law, geopolitics, or national policies ~~are~~ or interconnectivity are occassionally drafted for "drafts". An ISraeli cooperation on technologies will be pursued by eminent professors & and one short meeting and a follow up Scientific seminar!! ...

I have come to a conclusion that thanks to the general vague faith by the political class in Science & scientists; the cunningness of IAS, IAAS, IFS and Businessmen towards technologies; and the petty mindedness of "top scientists" and their caste systems, technology and engineering in the country in any operational / commercial sense is dead. Even some small and medium sector industries which struggle to absorb technologies and innovate further will be killed, thanks to FI/ICICI-type operations. No more of Hind Hi vacuum or old L&T, etc.

Atomic Energy never took off. The Space Programme is going to be killed in another 5 to 7 years! Wind down Launch Vehicles: VSSC bashing has helped in that. Even INSAT & IRS will be under pressure. Antrix Corp which ~~has~~ is mere an accounting outfit, will disappear or become a foreign agent! DRDO pockets of excellence will disappear sooner Kalam quits the scene.

I don't think ~~the~~ ISRO / DOS / Space Commission are looking at the policy and practical implications of 'opening up of sky'. Are we attempting aggressively to sell INSAT or subsystems? Or we attempting to design various forms of customised satellites and services? Attempting strategic alliances?... Or we, at least, doing paper exercises (as you used to ask us?) ... Well Why to create more Rajans, Janis, Chandras..(S. Chandrasekhars)., to be jettisonned into future dustbins? ...

Well the mind thinks.. Still there is no clear desire to quit the country and get a comfortable life for myself and wife and children with one-tenth of the effort I put in. I got the so-called Addl. Secy grade in DST (thanks to Dr. Vasant Gowariker and to your giving me out-of-turn promotion to 'G' in 1983!). I have completed nearly 5½ years now. Will be 50 years in April 1994 and on record 51 years. Will retire at 58 years. Will I get a Secretary level ? — probably only position of power (and therefore to be recognised as having contributed to Science!); I may get so many fellowships and awards. (As ProfMGK got best telecom person award!) .... More than anything ~~else~~ else, my independent thinking, not being allied to a group, and having no god-father will be a definite handicap for me. Who cares for hardwork or talent? They can cite many things against: a paper boy for Prof. Dhawan; even ISRO did not give him a position! No Ph.D.! No Scientist! Not even an NAS fellow! and what else....

It is with a deep historical sense I joined Science

and technology in the 1960's (around 16 then)
joined PRL in 1964 (20)...
despite various offers from Fairchild,
Hughes, & Philco-Ford returned
in 29 to ISRO (then to join you at
ISRO HQ as decided later by you).
... The same sense of history
gives me a serious pang, very
often, seeing what is happening
around the globe and in India I could forethink
the dissolution of USSR and merger
of FRG-GDR long before it was
talked about. I used to discuss
with Siddhartha, Chandra etc. Am I
to be a mere watcher? ~~not~~
Are my contributions to ISRO, not

even worth ~~as~~ footnotes in ISRO's not so long history? I ask this question because if the answer is ~~yes~~ that I am irrelevant for ISRO, I am definitely not going to be relevant after another 7 years of effort here (6 + 7 = 12), ~~given~~ the system being more fragile and cunning! ...

That is why, I still wondered why you phoned me whether Bhaskaran of Sussex talked to me or not? I also wonder why I got angry at his gossippy type approach? I should probably

~~...~~ have added some more <u>masala</u> about personality cults, clashes, pressures, etc which is what he was looking for. May be, I would have got a position in Sussex in due course! Why should I feel, if somebody speaks ill of ISRO's real technological achievements? Or ~~to~~ when they attempt to dismantle it?

... May be that is my weakness. I don't know how to seek personal gain out of a system! That is why I am <u>not</u> to be a <u>number one</u> material — in ISRO or anywhere! (What they call it, a 'killer instinct'?)

I am also sad to note

some deaths. Lovraj Kumar! I worked closely with him on TIFAC. He became also a Council member when it was recently reconstituted.

In my work here there are many who admire me and encourage me: Haksar or an Indiresan or S. Ganguly (of earlier IPCL) . . . there are numerous persons. ⊗ At working levels in labs etc also many pour affection (though they cannot do even a good technical work for TIFAC due to their institutional constraint); similarly in ISRO, any where I go from peon, to driver to many others are affectionate . . . Can I sustain the coming years merely on the basis of love and affection

⊗ Thanks to You & BP I am even now unique in having a span of perspective plan to system engineering to project mgmt to micro-admin/financial detail; so much, so so many consult me / see me to solve problems: in DST or other ministries or others.

of many powerless people (big and small) and work for hypocrites who will merely pick my brain and energy for their personal gains (power, position, profit etc)?

Even, if I were to gulp the situation that it is my destiny will these fellows ((powers-that-be & archaelogical layers & their hangers on)) allow me to function?

Won't they think I will be a danger in their midst and try to dump me?

This is a letter that won't finish.. because it is a human dilemma.... no deliverance of Buddhist nirvana or Hindu Brahman type .. may be only through the materialist philosophy of cellular decay and 'historical' evolution!

(P.T.O)

If, at all, you have read through the whole letter I should say THANK YOU!

With kind regards
and deep respects

Rajan

22/2/94

Dear Prof. Dhawan:

There is a possibility that you may be requested to head an apex body.

Notwithstanding what I have written, I think you should accept ~~it~~ — at least a last act by you to arrest further decay of the S&T system. You alone can do it. (I remember your cow-dung-pit-analogy). But dirt does not stick to saints. So pl. accept

Regards

Raja

22/2/94

seeing
Spl. Secy en
to DN[illegible]

MOST
IMMMEDIATE
PERSONAL

Y.S. Rajan

8/12/94

Prof. S. Dhawan

G. Srinivasan

~~RAMAN RESEARCH INSTITUTE~~
~~BANGALORE-560 080~~

New Delhi
8 - 12 - 94

My dear Prof. Dhawan:

I am writing this letter after considerable thought. I had decided <u>not</u> to raise the matter <u>in person</u> because I do <u>not</u> even want to cause any embarrassment to you through facial expressions or your need to say something to me.

I understand that a search process for Secretary DST may begin as Dr. P. Rama Rao is completing 58 years. Also he may be trying better pastures!

My request is that you

help me for Secretary position
in DST. or Dept of Oceans Dev. → Chances are high now
or any ~~such~~ departments.

I am not unaware
100-odd things which some of
the 'scientists-leaders' may say.
No Ph.D! No academy fellowship etc.
I know about my technical
knowledge and my ability to
judge and nurture good scientific basic
research proven in RESPOND or Space Sciences.
I had been largely guided by
what you had told about me
in private moments when I sought
your advice... Well you may
have your limitation in a system
where some may say a Director

has done scientific work but not when one gives a programme leadership in the proximity of ~~[illegible]~~ an eminent man! (even if it had been to make solid institutions!)

I leave ~~it~~ it to you.

I am not young any more.

— On paper reaching 52 in April 1995 (58yrs); retiring April ~~to~~ 2001. I have done my job for TIFAC spectacularly judged by a number of parameters: Industry recognition; international recognition; major projects with industry and so on. I have developed and motivated lots of youngsters here. If NNRMS was a good network, TIFAC is much bigger network. I am prepared to lay it down and be forgotten, as

it has happened with Space,
NNRMS etc. I cannot any more
suffer much lesser persons stealing
the limelight out of my creative
ideas and my energies/skills.

My request to you is
whether you can help become
a Secretary in Govt soon — not
necessarily in a 'scientific'
department?

Otherwise by middle of 1995
I would like to say 'good bye' to
all my 'selfless' service in the cause
of scientists and do something else
in business, industry, UN etc. Can you help
for such a change? I cannot
start a business or institute of my

own. Due to my concentration on ISRO work and now TIFAC/DST work, I have nothing but personal saving. After car loan, house loan & my second son's (hopefully) medical admission, after (Voluntary) retirement from Govt, I can hardly have a couple of lakhs — rest ~~is~~ are only an active mind, lots of energy, and knowledge/skills. I have to ~~mat~~ 'monetise' these for a living.

I have also enclosed a sheet of my ~~car~~ grade profile — required for the bureaucracy of consideration for Secy. I more than satisfy minimum requirement viz two years in Rs. 7300-7600/- grade (Addl. Secy level).

I am saturating in Rs. 7600/- for more than 3 ~~4~~ years now.

You need not reply to me. While I do not want to any 'politicking' as others do here, (have done etc), I thought I should not regret later that I did not inform you. That is all.

With kind regards & respects.

Rajan

8/12/94.

Various positions held by Shri Y.S.Rajan

Sl. No.	Grade/Designation	Pay Scale	Period From	Period To	Organisation
1.	Adviser	7300-7600 (Basic Pay Rs.7600 w.e.f 1.7.1991)	7.7.88	Continuing	DST
2.	Scientist 'H'	5900-7300	1.1.1988	6.7.1988	ISRO
3.	Scientist/ Engineer 'G'	5900-6700	1.1.1986	31.12.87	ISRO
		2250-2750 (Pre-revised)	1.1.1983	31.12.85	ISRO
4.	Scientist/ Engineer 'SG'	2000-2500	1.1.1981	31.12.82	ISRO
5.	Scientist/ Engineer 'SF'	1800-2250	1.1.1976	31.12.80	ISRO
6.	Engineer 'SE'	1100-1500	1.4.1973	31.12.75	ISRO
7.	Engineer 'SD'	700 -1200	1.4.1970	31.3.1973	SSTC, ISRO
8.	Electronic Engineer 'SC'	400 - 950	1.4.1967	31.3.1970	PRL, ISRO Ahmedabad
9.	Research Scholar		1964	1966	PRL

1. Date of birth 10.4.1943
2. Government service: Since 1.4.1967
3. Joint Secretary level Since 1.1.1983
4. Additional Secretary level Since 7.7.1988
5. He is Adviser, Department of Science & Technology and also Executive Director, Technology Information, Forecasting & Assessment Council (TIFAC).

Came on deputation from ISRO to DST.
Absorbed on transfer in DST on 16.1.1991

To Prof S. Dhawan

Bangalore

Tele. No. : 666073 (Off.)
603428 (Resi.)

Y. S. Rajan

DII/53 WEST KIDWAI NAGAR,
NEW DELHI - 110 023

My dear Prof. Dhawan:

You might have heard about the appointment of new Secretary, DST. My communications with you on "the writing on the wall" came to my mind..

~~Ul~~ Unlike the Eklavya of Mahabharat, this Eklavya grew a second thumb, which has also been chopped off. Now a third thumb has to be grown... I am in search of a place where I can.

I need a help urgently. Can you at least give a TO WHOM IT MAY CONCERN type of certificate about me which I can attach. I would be grateful, if it can cover my work at TIFAC, DST etc. — also to fit both Govt & private sector even international agencies. I am keeping a biodata for reference.

With kind regards & respects,

Rajan
15/6/95

Two enclosures

(i) TIFAC accomplish

(ii) Biodata.

MOST URGENT

By Speed Post

~~011-673545~~

Prof S. Dhawan,
No 7/11, Palace Cross Road
BANGALORE- 560002

29/6/95
Seek help
GSD
fr Spl Secy

33

13-4-96

Regd No.......... Date..........
SPEED POST
Safdarjung Stg/1, N.Delhi-3

From
Y. S. Rajan
DST, Tech. Bhavan
New Delhi 110016.

NEW DELHI - 110

29. 6. 95

8724

30.0

<u>IMMEDIATE</u>

DII/53 West Kidwai Nagar, N.D. 110023
Tele. No.: 666073 (Off.)
603428 (Resi.)

Y. S. Rajan

My dear Prof. Dhawan: Learnt from Mrs. Loomba that you are recovering from a cataract operation. Could <u>not</u> contact you due to telephone strike. Hope you are recovering fast.

In addition to what I had requested in my earlier letter which is for a long term solution, I need an urgent help to salvage my situation. Now that nobody can accuse you of placing a Secretary DST etc, a personal help will greatly relieve me.

Would you please <u>talk</u> to Sh A.N. Verma, Principal Secretary to PM and explain to him <u>two</u> points:

(ONE) About me: how I am <u>not</u> the usual type and how you shaped me and how I have done so far and (TWO) I am <u>senior</u> to the newly selected Secretary DST from my ISRO days to my current level (~7 years at Addl Secretary level).

(P.T.O)

Would you also please request him that I be placed even for a couple of years under Cab Sectt or P.M.O or any other non-S&T Ministry as Special Secretary very soon. Any type of job will do. (You may say about my versatility). He may be requested to call for my records and effect the orders urgently.

Would be ever grateful to you to save me from an utterly humiliating situation. (I feel very bad to disturb you more; but I need a remedy fast.

With kind regards and respects.

Rajan

29/6/95

P.S. I am proceeding on leave for two months from 1st July.

No Misc/Adv(R)/95

By Speed Post

(u)

3

→ YS Rajan

To

~~Prof. S. Dhawan,~~
~~No 7/11,~~
~~Palace Cross Road,~~
~~BANGALORE - 560002~~

EMS SPEED POST DELHI
BOOK NOW-PAY LATER SCHEME
NO. 10:93-4
DATE
WEIGHT 15/6

15/6/195
97

From

(Y. S. RAJAN)
Executive Director
Technology Information, Forecasting
& Assessment Council
Technology Bhawan, New Mehrauli Road
New Delhi-110 016

प्रौद्योगिकी सूचना, पूर्वानुमान एवं मूल्यांकन परिषद
विज्ञान एवं प्रौद्योगिकी विभाग
टेक्नॉलाजी भवन, नया महरौली मार्ग, नई दिल्ली -110 016.

TECHNOLOGY INFORMATION, FORECASTING AND ASSESSMENT COUNCIL
DEPARTMENT OF SCIENCE AND TECHNOLOGY,
TECHNOLOGY BHAVAN, NEW MEHRAULI ROAD, NEW DELHI-110 016.

17/8/95

My dear Prof. Dhawan:

I was on leave during July though I was attending office for some critical work. Vikram's admission for M.B.B.S at Maulana Azad College at Delhi is completed. He is attending college from Aug 1.

I am also attending DST after leave from ~~[illegible]~~ July 31.

I don't know how far the paper about me is moving.

I will meet you some time soon, when I am able to make to Bangalore.

Hope your eye is back to normal

With kind regards & respects Raja

Y. S. RAJAN

D-II/53, West Kidwai Nagar,
NEW DELHI -110023.
Telephone Nos: 666073 (Off)
603438 (Res)
Telefax: 6857643
August 16, 1995

Dear Professor Dhawan,

I am enclosing an extract of my letter to the Chairman, Stockholm Environment Institute, Sweden, together with its enclosures. I have taken the liberty of giving your name as one of the referees. I would be grateful if you would do the needful as and when a reference is made to you by the Stockholm Environment Institute.

2. A copy each of 'further particulars' and 'publications' received subsequently from SEI is also enclosed for perusal.

With kind personal regards,

Yours sincerely,

Raja

(Y.S.Rajan)

Professor S. Dhawan,
7/11, Palace Cross Road,
Bangalore - 560002,

Y. S. RAJAN

D-II/53, West Kidwai Nagar,
NEW DELHI -110023.
Telephone Nos: 666073 (Off)
603438 (Res)
Telefax: 6857643
August 4, 1995

To:

Mrs. Karin Soder,
Chairman
Stockholm Environment Institute Board,
Box 2142,
S-103 14 Stockholm,
Sweden **FAX No: 00-46 8 611 50 35**

Dear Madam,

This is in response to your advertisement in **The Economist** of June 17, 1995 regarding appointment of Director for Stockholm Environment Institute.

2. With my extensive background through working in India for the development of Space Programme and also subsequently in establishing the Institute for Technology Information, Forecasting and Assessment, called TIFAC, I believe I would fit in the position very well. My longstanding and successful interactions with many countries in the world, both developed and developing, would be an added advantage. I have considerable experience on various aspects of environment: ranging from the atmospheric studies to policies to legal issues to developmental planning to technology transfer. In my latest assignment in TIFAC, I have been deeply involved in environmentally sound technologies of relevance to industries with commercial interest and for other projects for public good. In addition I have worked for a number of Government programmes relating to sustainable development. I have a very good and sustained experience in networking of individuals, both inside and outside my organisation (of persons and institutions with varied interests).

3. I am enclosing a brief highlight of my activities in the field of environment in Annexure-I. Since my work at TIFAC is particularly important in the context of sustainable development and environmentally sound technologies, I am enclosing a brief write up of the accomplishment of TIFAC, of which I am the first Executive Director (CEO), since 1988, in Annexure -II. An elaborate biodata is in Annexure - III.

4. In order for you to make an independent assessment about me I give <u>six</u> references:

xx	xx
xx	xx

Thanking you,

Yours sincerely,
sd1-
(Y.S.Rajan)

HIGHLIGHTS OF MR. Y. S. RAJAN'S PROFESSIONAL ACTIVITIES IN THE FIELD OF ENVIRONMENT

* His early years of research career was in Space-physics and hence has a good knowledge of atmospheric physics. This knowledge and further experience were later consolidated through his responsibilities for programme management of Space Science and Space Meteorology as Scientific Secretary ISRO (Indian Space Research Organisation).

* Specialised in Remote Sensing of the Earth since 70's. Had a special key role in introducing remote sensing applications in India leading to total system of Satellites, ground system and a network of independent application Centres. There were several environmental applications, the earliest one being the survey of forests; the technique has been operationalised. Wasteland identification is another major effort.

* Was Director, Earth Observation System of ISRO/ Department of Space. Also played a key role in the establishment of National Natural Resources Management System (NNRMS) in India aimed at integrating remote sensing with other data to lead to optimal management of natural resources.

* Established several Regional Remote Sensing Centres in India.

* An active member of Editorial Advisory Board of International Journal on Remote Sensing.

* Elected Member of International Academy of Astronautics.

* Had an active role in COSPAR. Played an important role in formulating International Geosphere Biosphere Programme in India (IGBP).

* Has been responsible for international cooperation of ISRO with many countries in Europe, North America, Latin America, Africa and Australia. Was also responsible for initiating Indo-Swedish Cooperation in Space.

* Widely travelled to about 25 countries in all continents -some several times.

* Led Indian delegation to United Nations Committee on Peaceful Uses of Outerspace for several years.

* Played a key role for the multipurpose (TV,Telecom and Meteorology) geosynchronous Indian National Satellite (INSAT) since 70's.

... contd.

* Subsequently at the Department of Science and Technology (DST) made several important contribution to mapping and digital cartography.

* Active participation in policy formulation on many Environmental issues pertaining to the country (ranging from responses to Montreal Protocol, GEF, Agenda 21, etc.)

* Member of many important Committees of the Ministry of Environment, Government of India.

* Fully knowledgeable and contributed to ocean remote sensing including marine pollution monitoring.

* Had been Specialist Consultant/Adviser to UNCED on issues relating to Transfer of Environmentally Sound Technologies and Intellectual Property Rights.

* The first Executive Director (CEO) of India's **Technology Information, Forecasting and Assessment Council** and was responsible for networking many specialist groups, industries and NGOs in Technology Forecast and Technology Assessment efforts. TIFAC has brought out more than 150 reports of which about 25 specially address environmental issues ranging from Fly Ash Utilisation, Waste Water Treatment, etc Other reports address environmental issues and a part of technology assessment.

* In addition, has launched a major joint effort on various technologies for Fly Ash Utilisation (Government - Industry- User supported).

* Has a close knowledge of the problems of industries in developing countries especially in the context of environmental issues; raw material conservation; energy conservation, etc; specialised in technology transfer.

* Responsible for several training programmes - from top corporate level to working levels.

* Several international recognitions for TIFAC's work including UNIDO, UNEP, etc.

* Excellent motivator; organiser; communicator; and networked with an established record of about two decades of institution building.

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Annexure -II

TECHNOLOGY INFORMATION, FORCASTING AND ASSESSMENT COUNCIL (TIFAC) - A BRIEF

* Established as an autonomous body in 1988 under DST. Started functioning from mid 1988.

* Governing Council reconstituted in September, 1993 with Dr. A. P.J. Abdul Kalam, Secretary, DRD as Chairman, and as Members Senior Government officials, Industrialists and Industry Associations, eminent Scientists, Financial Institutions and Academia. List enclosed.

* Main Tasks are: Undertake and Generate Technology Forecast, Technology Assessment andTechno-MarketSurvey Studies; Formulation of preferred options for India; Establish technology information systems; and Promotion of Key Technologies.

* During past 6 years have brought out more than 100 studies in:

  - Steel and Materials
  - Energy
  - Biotechnology
  - Human Settlement
  - Environmental related issues
  - Manufacturing industries
  - Biomedical
  - Transportation
  - Technology Planning/Experience of other countries
  - Instrumentation
  - Sugar
  - Information Technology

* Reports are made available at nominal cost. Well received by industries and institutions. Revenue generated till now Rs. 22 lakhs is an indication of interest.

* In addition, the follow up of the reports has led to certain major programmes:

  a) Technology Project on Mission Mode on Sugar Production Technologies
  b) Technology Project on Mission Mode on Fly Ash Disposal and Utilisation
  c) Development of Floor Reaction Orthoses (FRO), a support device for persons afflicted by Polio
  d) Two specific Projects are under active consideration of Ministry of Steel:
     i) Energy recovery system development in mini steel plants
     ii) Continuous Castings Simulator-cum-Pilot Plant for Steel making
  e) Two Projects have been planned in Indo-German cooperation
     i) Plasma Immersion on Ion implantation
     ii) Rough Diamond Coatings

* To create sustained mechanisms for forward thinking and advance actions, Institutional Mechanisms have been created to take follow-up actions. Nine joint Boards/mechanisms have been set up:

  (a) TIFAC-RCI on Advanced Composites
  (b) TIFAC-NAL on Aviation Products and Services
  (c) TIFAC-CSIO on Instrumentation
  (d) TIFAC-CLCR on Liquid Crystal Display Systems
  (e) TIFAC-DOE on Electronics Technologies
  (f) TIFAC-CLRI on Leather Technologies

(g) TIFAC-NCL on Chemical, Membrane and Ploymer Technologies
(h) TIFAC-CII on Industry Interaction
(i) TIFAC-SBMT on Biomedical Devices

These Boards focus on areas identified at the broad levelforecasts to work out further details with users and industries for narrowing down areas of actions. Based on such work, 2 major technology missions (Advanced Composties & Leather) have already been approved. Also several other initiatives are under way.

* Special Initiatives have been taken in emerging areas of Steel, Computational Facilities, Surface Engineering

* Promotes <u>specific Home Grown Technologies</u> to strengthen the linkages between Research Institutions and Industries by commercialisation of technologies. DG,CSIR chairs the High Level Core Group to approve the Projects and many national experts evaluate and are involved in its work. Commercialisation Projects already funded:

  - High Energy Rare Earth Permanent Magnets with NFTDC, Hyderabad
  - Cobalt recovery with HZL, Udaipur
  - Substitute of Kerosene in Synthetic Thickener with ATIRA, Ahmedabad
  - Rapid Diagnostics - BhartiyaAgro Industries Foundation (BAIF), Pune
  - CFC Substitutes, HFC 134A
  - CO based Chemicals
  - Vitamin A

    Indian Institute of Chemical Technology, Hyderabad
  - Biofertilizers - BAIF, Pune
  - 64 Bit Parallel Computer Flosolver with NAL-WIPRO.
  - More Projects are under active consideration

* Provides linkages with Ministries/Industry Associations/ Academic Institutions:

  - Through S&T Advisory Committees in 21 Socio-Economic Ministries.

  - Interaction with industry associations like CII, FICCI, ASSOCHAM for joint studies and holding technology workshops.

  - With All India Council for technical education for familiarising students of technical colleges with methodologies of technology forecasting, assessment and techno-market survey and to tailor the courses in tune with emerging technotogies. 19 engineering colleges are involved in this programe.

  - Taken up a Project on Technology Menu for end use of energy, jointly with International Energy Initiatives.

* Set up TIFACLINE Data Base in cooperation with CMC. Technology Database available on Composites, Food Processing, Non-Ferrous Materials, Energy and Environment and Supplementary Databases on Standards and Experts.

* A Patent Facilitating Cell has been set up.

* UNIDO has requested TIFAC to be a nodal point for Technology Monitoring in Developing Countries for generation of biannual reports on technologies.

* Based on Studies undertaken by TIFAC, 3 Mission Mode Projects have been approved by Government and entrusted to TIFAC for implementation.

  - Sugar Production Technologies (30 factories)
  - Advanced Composites (10 Products+8 Strategic inputs)
  - Flyash Disposal and Utilisation (9 Thrust areas)

  These projects are implementated in close cooperation with Ministry of Food, Ministry of Power, Ministry of Environmentand Forests and Departmentof Defence Research and Development.

* TIFAC study "Indian Leather - 2010, A Technology, Industry and Trade Forecast" has also assisted in formulation of Leather Mission recently approved and executed by CSIR.

* Steel Projects: Based on major initiatives taken by TIFAC, Ministry of Steel are considering two specific projects:

  (a) Energy Efficiency Improvement in Secondary Steel Sector
  (b) Pilot Plant-Cum-Simulator for Continuous Casting.

* Bio-Medical Devices:

  Undertaken Societal Medical Devices in cooperation with Defence Research and Development Organisation, Ministry of Welfare and Ministry of Rural Development, Nizam Institute of Medical Sciences.

* Based on the excellent coverage of areas by TIFAC, the newly constituted Council stressed the need for Long term Forecast in Technologies. Council has set up 9 Task Forces.

TASK FORCE	LED BY COUNCIL MEMBER
Agro-Food Processing	Ms LF Poonawalla, ALFA Lavel
Aviation	Prof. R. Narasimha, TIFAC-NAL Board
Electric Power	President, CII
Road Transportation	President, FICCI
Sensors	Dr. B. Bowonder, ASCI
Telecommunication	Dr. B. D. Pradhan, C - DOT
Waterways	President, ASSOCHAM
IPR related activities	Dr. R. A. Mashelkar, NCL
Future Technology Forecast for India for 2020 (With eleven Panels)	President, CII

Task Forces are led by eminent industrialists, Presidents of Industry Associations or eminent scientists/technologists. Actively involves several hundred experts.

15.5.95

[C]
June, 1995

SHRI Y.S. RAJAN
CONTRIBUTIONS AND ACHIEVEMENTS

1. Shri Y.S.Rajan has made numerous contributions to the Indian Space Programme for about two-and-half decades through his dynamic performance. He has undertaken and executed many important scientific, technical and managerial tasks for the Indian Space Research Organisation (ISRO). His key role as an organisation person at an apex level in shaping ISRO/Department of Space (DOS) has been crucial to the success of space programme. He has a unique and continuous blend of experience not only in technology development and programme management, but also in having a direct executive responsibility in all aspects of Government administration and financial managemet (from policy level to procedural execution) since 1976 in ISRO/DOS reporting directly to Secretary, DOS. He played a vital role in evolving and implementing many innovative successful projects-, personnel- and financial-management systems in ISRO/DOS. As Scientific Secretary, ISRO, he, in addition, made the ISRO/DOS international co-operative programmes with many countries a success. He has worked closely with some of the eminent Indian Scientists/technologists like Dr. Vikram Sarabhai, Prof. Satish Dhawan, Dr. Brahm Prakash, Prof. Yash Pal, Dr. Vasant Gowariker, Prof. U.R.Rao, Dr. A.P.J. Abdul Kalam - the founders and consolidators of the Indian Space Programme. Has acquired considerable administrative experience working with Shri M.A. Vellodi (formerly Secretary, MEA), Shri T.N.Seshan (presently Chief Election Commissioner) and Shri Y.S. Das (formerly Secretary, Department of Culture).

2. Since mid-1988, with his rich experience in ISRO/DOS, he has taken up an important assignment for technology development in the country as **Adviser** in the Department of Science and Technology. He is, in addition,the first **Executive Director and Member-Secretary of the Technology Information, Forecasting and Assessment Council (TIFAC)**, a unique and new institution which he has built up and shaped for about seven years under the overall direction of its Chairman/Members. The Council comprises many eminent administrators, technologists and industry persons. His vast experience in finance and administration in ISRO/DOS was drawn upon to restructure several aspects of functioning of DST as well as for review of policies of other Government Departments.

3. Shri Y.S.Rajan (52 years, date of birth: 10-4-1943) has a post graduate degree in Physics with Electronics as the Special Subject (M.Sc. 1964, Bombay University). He had a uniformly first class academic career.

4. During his initial period of professional career (1964-1969), he developed a number of electronics/microwave hardware and instrumentation required for the Space Sciences and Sounding Rocket Programme. Some of them had gone into production. He then concentrated on the system engineering of the electronics ground systems required for Indian Launch Vehicles. He was, since mid-1970, assigned some important Systems Engineering tasks for the Satellite Instructional Television Experiment (SITE), a unique experiment in the world at that time. As a first task, he was an active member of the ISRO-MIT/Linchon Study Team (in USA) for the Indian National Satellite (INSAT) for several months during 1970. He made many valuable contributions to the study and to the field of Satellite Communications in India. Later he was deputed to the Goddard Space Flight Centre of the National Aeronautics and Space Administration (NASA), USA. He was associated with NASA's Application Technology Satellite (ATS-6) project during 1970-1973. His contributions to the project were widely appreciated by the NASA management.

5. On his return to India by end-1973, for a brief period he assisted Prof. Yash Pal, Director, Space Applications Centre in organising several new initiatives beyond SITE. Since 1974, he was a Key Staff Scientist to Chairman, ISRO/Secretary, Department of Space (DOS)/Chairman, Space Commission. [i.e. to Prof. S. Dhawan during 1974-1984 and Prof. U.R.Rao during 1984-1988]. In this capacity, his contributions to planning, systems engineering and techno-management of many satellite, launch vehicle and application projects are numerous. He also played an important role in the evolution of Indian space qualifcation systems and reliability engineering (Hi Rel parts,etc.).

6. In addition to the above, as the Assistant Scientific Secretary, ISRO (1976--1979) and the Scientific Secretary, ISRO (1979-1988), Shri Rajan was the focal point of most of international co-operative activities of ISRO/DOS. His technical knowledge, diplomatic and negotiating skills and managerial experience helped in a great measure the success of the cooperative projects. He was the member of Indian delegation to the UN Committee on the Peaceful Uses of Outer Space (COPUOS) and has also led the Indian delegation on several occasions. He played a key role as a member of Indian delegation to UN Conference UNISPACE -82 held at Vienna. Through such activities he has made several important contributions to the evolution of International Space Law. He also held or is holding some official positions in the international scientific bodies like Committee on Space Research (COSPAR) and International Astronautical Federation (IAF). The rich experience was also drawn upon in DST on

various international tasks of DST such as NAM S&T Centre, Intellectual Property related negotiations, Environmental treaties, to cite a few examples.

7. Other noteworthy key responsibilties as the Assistant Scientific Secretary, ISRO and Scientific Secretary, ISRO are the interfaces with public, press, Parliament, Planning Commission and other Government agencies as well as networking of individuals within and outside ISRO and institutions. He was responsible for, in several ways, the organisation of the ISRO System for bringing out Technical Reports, Annual Reports, and excellent brochures as well as organising systematic exhibitions. He has special talents for communication of ideas to various persons: VIPs to technical specialists to - general audience, at different aggregate levels.

8. He completed the vital task of the evolution of the Space Programme Profile of 1980-90; he was the focal point in ISRO/DOS in the formulation and coordination of its cycling at various levels of ISRO/DOS and Government. He played a similar role for the Profile 1990-2000 as the Convenor of the Working Group of ISRO/DOS.

9. In the field of Space Sciences his role has been primarily in terms of assisting the promotion through involvement of several eminent national Scientists and helping them in developing necessary managerial mechanisms. Notable examples are in the programmes of MONEX -77/79; Indian Middle Atmospheric Programme (IMAP); Mesosphere-Stratosphere-Troposphere (MST) Radar; and several joint international space science experiments. Played certain special role for the Indian manned space flights.

10. Another special contribution of Shri Y.S.Rajan to the Space Applications in the country, besides his contributions in the area of Satellite Communications, under the overall guidance of Prof. S. Dhawan, since 1978 was the conceptualisation and implementation of the unique National Natural Resources Management Systems (NNRMS). This involves continual work with all the State Governments and Central Ministries/agencies. His dynamic nodal role led to the Government decision on establishing NNRMS in 1985. He stimulated through his techno-managerial efforts, the establishment of many Remote Sensing Centres in the States, Remote Sensing Units in many Central Government agencies and the regional Remote Sensing Centres. Through his sustained efforts India made a significant presence in many international forums. The two special issues of NNRMS in the International Journal of Remote Sensing edited by Shri Y.S.Rajan are

noteworthy. Indian systems for Remote Sensing have a special role to play in national development, thanks to these efforts.

11. Shri Rajan has since 1974 contributed significantly to the evolution of ISRO- Industry interface which encompasses Technology Transfer, utilisation of Industry infrastructure, etc. Of special mention are the systems for ISRO -BEL and ISRO-HAL joint efforts in the Space programme. As Scientific Secretary, ISRO he was also responsible for managing the extra-mural research funding programme of ISRO called RESPOND and contributed to establishing some special mechanisms for linkages with academic institutions.

12. An entirely different facet of Shri Rajan's action-packed career in ISRO/DOS relates to his close association and direct executive experience since 1976 with the administrative, financial and personnel policy related aspects of ISRO/DOS and the Government of India. Merit review and promotion schemes for scientists and technicians in ISRO/DOS and several other well codified procedures for career opportunities for all the staff, purchase procedures and project management systems for large projects of ISRO like SLV-3, PSLV, INSAT, and other satellite projects are a few examples. He has closely worked with some eminent senior administrative persons of India, in evolving and implementing successfully several administrative, financial and personnel related policies and procedures which are responsive to the needs of an S&T organisation within the frame work of the Government systems and "without being needlessly inelastic". He has also helped a few other Government Departments in evolving such procedures. He played an important role in operationalising Zero Based Budgetting (ZBB) in ISRO/DOS which is in operation since late seventies, well before its importance was recognised in Government. He, as Scientific Secretary, ISRO, was directly responsible for programme - budget balancing, prioritisation, project appraisal and reviews and advanced planning. He was, as a part of his direct responsibility, instrumental in evolving an excellent working system for ISRO/DOS interaction with the Planning Commission. He has also played an active role in ISRO/DOS Joint Consultative Machinery, for furtherance of welfare of the staff.

13. Shri Rajan is exceptionally good in motivating persons at all level and in reorienting them to newer tasks and challenges.

14. All the above contributions would not have been possible without his ability to network with several other active and dynamic persons - at the equal level as

well as senior/junior levels. Shri Rajan has excellent communication capabilities and a special <u>ability to interact with all levels of persons within and outside the organisation</u>. He has trained several young persons in ISRO/DOS to take up newer and challenging responsibilities and has done similarly later at DST/TIFAC after he moved over to DST in 1988.

15. Since mid-1988, on joining the Department of Science & Technology (DST), he has actively built up TIFAC, as the first Executive Director from its foundation. Technology forecasting and assessment activities in the country have started receiving a special recognition in a number of Government agencies and industries due to his sustained efforts of organising study teams. TIFAC has now established follow up mechanisms for its recommendations resulting from its studies such as, Sugar, Steel, Performance Materials, Titanium, Composites, Instrumentation, Aviation, Human Settlement and Energy. He has also organised initiation of a pilot project on a decentralised interactive Information System on emerging technologies called TIFACLINE. The project has entered a limited operational phase. TIFAC's excellent work is also receiving several international recognition. Major technology projects in a mission mode have resulted from TIFAC work: Sugar Technology, Advanced Composites, and Fly Ash Utilisation being executed by TIFAC and on Leather being implemented by CSIR.

16. Many new viable mechanisms to link laboratories and industries have been developed to pursue the findings of technology forecasting and assessment studies and techno-market surveys of TIFAC. Special unique and active linkages are being developed with UNIDO and Confederation of Indian Industries (CII) which represents about 70% of Indian industries. With the latter the actions include promotion of technology consciousness and actions with industries. Also notable are the achievements of TIFAC in having close linkages with socio-economic Ministries/Departments which increasingly seek the advice of TIFAC and special linkages with excellent R&D institutions through Specialised Boards.

17. Noting the excellent work done by TIFAC since 1988 covering large number of areas in depth in terms of forecasting, assessment and market surveys, the newly reconstituted TIFAC Council intitiated a number of major Task Forces in Agro Food Processing, Road Transport, Waterways, Aviation, Electric Power, Telecommunication and Advanced Sensors. In addition a very major first of the kind of exercise in India on Future Technology Vision for India 2020 has been taken up through a Task Force with the 11 Panels. There is also a Task Force on Intellectual Property related activities. These Task Forces and Panels are led by eminent

industrialists and technologists. The networking requirement for these are two orders more than what was done earlier. Shri Rajan has successfully initiated these and many of the Task Forces and Panels have been working very well with reports expected during 1995.

18. Noting the work done by TIFAC, UNIDO had requested TIFAC to organise a Meeting on Cooperation in Technology Monitoring in Developing Countries. This was held during 22-25 November, 1994 at New Delhi. UNIDO papers recommend TIFAC as an institutional model best suited for the developing countries who are in the process of establishing their own technology monitoring infrastructure. Another major initiative successfully completed by TIFAC is to have the first ASEAN and India Joint Meeting on S&T Cooperation. It was organised during 6-10 February, 1995. Detailed work plan in three major disciplines, namely, Biotechnology, Advance Material and Information Technology has been identified. The successfull conclusion of this Joint Meeting is considered to be a significant step in the cooperation between Indian and ASEAN countries.

19. Shri Rajan has a unique experience of blending technology development and programme management experience with the direct executive experience in handling all aspects of Government administration (from policy level to procedural execution whether it is in personnel management, purchases or contracts) since 1976 in ISRO at the apex level of Department of Space (see para 12). This rich practical experience has been carried forward in DST. He has helped in various aspects concerning restructuring of DST and is Chairman, Administrative Board in DST. Increasingly other Government Departments/agencies derive the benefit of his rich executive administrative experience to conduct many important reviews of personnel policies of S&T personnel, e.g. Flexible Complementing System; formulation of rules for various S&T institutions, etc. He is the Chairman of an Inter Departmental Committee of S&T departments set up to consider 5th Pay Commission related inputs.

20. Since his days of corporate apex level management role in ISRO/Department of Space (DOS) (1976), he has played a key role in financial management of ISRO/DOS- from programme-budget linkages to project appraisals to financial/parliamentary requirements. He also led the analysis-cum-synthesis for all of ISRO/DOS for Annual Budgets, Revised Estimates, Five Year Plans as well as the Decade Profile which was unique to ISRO (see para 12). His experience is equally drawn for DST in a variety of ways including various preparatory actions relating to the amendment of R&D Cess Act of 1986 and the plans for its management.

21. He also plays an important overview role in DST for a number of information systems related projects (e.g. Digital Cartography Systems of Survey of India, Geographic Information Systems), intellectual property rights and international programmes. He assists Secretary, DST (Dr. Vasant Gowariker upto April 1991 and presently Dr. P. Rama Rao) in several new policy and programme initiatives. He represents Secretary, DST on many Government and other forums. He recently presented DST programme to the Department-related Parliamentary Standing Committee on Science & Technology, Environment and Forests (1993-94).

22. Shri Rajan has a rich practical experience in the initiation and evolution of data bases/information systems on technologies and related systems as well as special documentation systems.

23. He has a wide ranging experience in various aspects of environmental interfaces with technologies and also scientific aspects of environment.

24. He has a deep knowledge in all aspects of Intellectual Property Rights. Strengthened over the past five years. Was responsible for organising and bringing out practical guide on patenting.

25. He has completed a few special assignments on their invitation for United Nations Conference on Environment and Development (UNCED) and World Intellectual Property Organisation (WIPO) on Environmental Friendly Technologies and IPRs.

26. He is one of important contributors to various aspects of technology management in the country and propagating interest in key personnel in a large number of institutions/industry associations. Was invited to present a National Paper on Technology Development and Transfer in unique Indo-German Workshop during 7-10 Febaruary, 1995.

27. Assisted Secretary, DST and MOS (S&T) in the evolution of the draft for a new Technology Policy. Has an extensive knowledge in technology policy and management in other countries (developed and developing).

28. He has experience from ISRO and DST for evaluation as well as initiation of special projects for organisations such as UNDP.

29. Experience in identifying and selectively promoting key Homegrown Technologies under TIFAC; has been responsible in shaping this programme from the beginning and has introduced special contracting mechanisms. Also a member of Technical

Advisory Committee for the Programme Aimed at Technological Self Reliance (PATSER) of the Department of Scientific and Industrial Research. Advises the Risk Capital and Technology Finance Corporation Ltd. (RCTC) and ICICI on SPREAD (an R&D funding scheme - soft loan).

30. Closely associated with industry associations and organisations. Shri Rajan's advice is sought by them on many science and technology matters regularly. He recently visited Germany as a members of Confederation of India Industry (CII) Mission to R&D Centres in Germany from 7th to 12th February, 1994.

31. He is responsible for conceptualising, organising and obtaining approvals for the major Mission Mode Projects, i.e. Sugar Technology Mission, Advanced Composites Product Mission and Fly Ash Utilisation, all of them having a strong inter-ministerial participation. He has also established implementation mechanisms. He has taken a lead role in the Ministry of Steel programme to mount a major effort in Continuous Casting Pilot Plants and Energy Saving in mini-Steel Sector.

32. Shri Rajan has travelled widely in India (most parts) and abroad about 25 countries in all continents. He has excellent professional working relationships with a large number of persons in Government, R&D laboratories, academic institutions and industry.

33. Assisted Dr. Vasant Gowariker, Adviser to PM on Science and Technology and Dr. S.Z. Qasim, Member, Planning Commission in conceptualising and bringing out books on "Science, Population and Development" and "Science and Quality of Life" respectively when they were General Presidents of Indian Science Congress Association.

34. Some of the notable academic activities of Shri Y.S.Rajan are:-

(i) Co-Editing of Book on Remote Sensing published by the Indian Academy of Sciences (1984).

(ii) Technical Editor of a special issue on the Indian National Natural Resources Management System (NNRMS) in the International Journal of Remote Sensing - IJRS Vol.6, No.4 & 5 (1985).

(iii) Visiting Professor, Anna University in Remote Sensing from 1982 to 1988.

(iv) Elected Member of the Section-1 (Basic Sciences) of the International Academy of tronautics (IAA) in 1986.

(v) Member of Institute of Electrical & Electronics Engineers (IEEE) till 1992.

(vi) Fellow of the British Interplenatary Society till 1988.

(vii) Vice Chairman of a COSPAR Sub-Commission A.3 on Geology and Producitivity of the Land Surface and the Oceans, for the term 1984-1988.

(viii) Member of the International Astronautical Federation (IAF) Technical Committee on Space Exploration (since April 1985).

(ix) Member-Secretary, Indian National Committee for Space Research (INCOSPAR) of INSA (1982-1987).

(x) Member, Scientific Advisory Committee of Indian Middle Atmospheric Programme. (1982-1988)

(xi) Member of Editorial Advisory Board of international Journal of Remote Sensing.

(xii) Member of Editorial Board, Current Science.

(xiii) Life Member of the Indian Geophysical Union and recently elected Fellow.

(xiv) Life Member of Indian Science Congress Association (ISCA).

(xv) Member of Executive Committee and Executive Council of ISCA (1989 - 1993).

(xvi) Member, Editorial Board, the Journal "Space Policy", UK.

(xvii) Member, Editorial Board, Defence Science Journal.

(xviii) Member of the Executive Committee of International Association of Technology Assessment and Forecasting Institutions (IATAFI)

(xix) Life Member, Indian National Cartographic Assn.

(xx) Director, Executive Council, Indian Society for Advancement of Meterials and Process Engineering (ISAMPE) (1993-1995).

(xxi) Delivers several lectures on Technology Management in management education related institutions, CSIR training schools, etc.

(xxii) Has been an examiner for M.Tech. thesis and has guided successfully a student for Ph.D.

33. **OTHERS :**

(a) Award :(i) Received **Fuel Instruments & Engineers Foundation (FIE) Award** for 1991 for eminence in the field of Science & Technology.

(ii) Received Jawaharlal Nehru Birth Centenary Award for 1991-92 conferred by Indian Science Congress Association.

(b) Member of RC of Central Scientific Instruments Organisation (CSIO) since 1991.

(c) Member of RC the National Chemical Laboratory (NCL), Pune since 1994.

(d) Member of Sponsored Research and Development Programme (SPREAD) Approval Committee of Industrial Credit and Investment Corporation of India, since 1990.

34. **PUBLICATIONS :**

Most of the technical works of Shri Rajan are available as internal ISRO/DOS notes/memoranda and Study Group Reports. A few of the technical works have been brought out as technical reports/memoranda/papers in journals,etc. He has also delivered talks, some of which have been brought out as papers. All these would be about 100 in number.

SEI

STOCKHOLM ENVIRONMENT INSTITUTE (SEI)

Further Particulars for the Post of Director of the Institute

The *Stockholm Environment Institute (SEI)* was founded in 1989 by the Swedish Parliament. It is an independent Foundation receiving financial support from the Government, through the Ministry of the Environment. It was established to carry out research on international issues, relating to development and environment, leading to policy formulation. It does this from its headquarters in Stockholm and its three centres in Boston (USA), Tallinn (Estonia) and York (United Kingdom). It has a number of associated staff in other locations (London, Brussels and elsewhere); it collaborates with individuals and institutions world-wide and also has a network of associated workers and consultants throughout the world. The Director is the Chief Executive Officer of the Institute, including its constituent parts, and is responsible for the programme, all the staff matters and the finances of the Institute. The Director is supported by over 55 staff members and the work of the Institute is overseen by an International Board.

The *Programme* of the Institute is policy oriented and focuses on the linkages between development and environment. It works in Africa, Asia, Europe, North America and South America. Projects fall into four broad categories:

- *natural resource evaluation*, assessment and planning with emphasis on energy and water;
- *technological options* for the use of natural resources, including clean production;
- the *environmental impacts* resulting from natural resources use;
- *environmental management* and policies.

SEI

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The annual turnover of SEI is about SEK 48 million of which, at present, SEK 12 million is contributed as core support from the Swedish Government. Much of the additional support is for projects and the Director, together with SEI staff, has a full programme of fund-seeking initiatives and support activities to undertake. This involves international travel both within and outside Europe as do field project visits, from time to time. The Director keeps close contact with certain like-minded international institutes.

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Additional information is available in the attached:

- Stockholm Environment Institute Brochure
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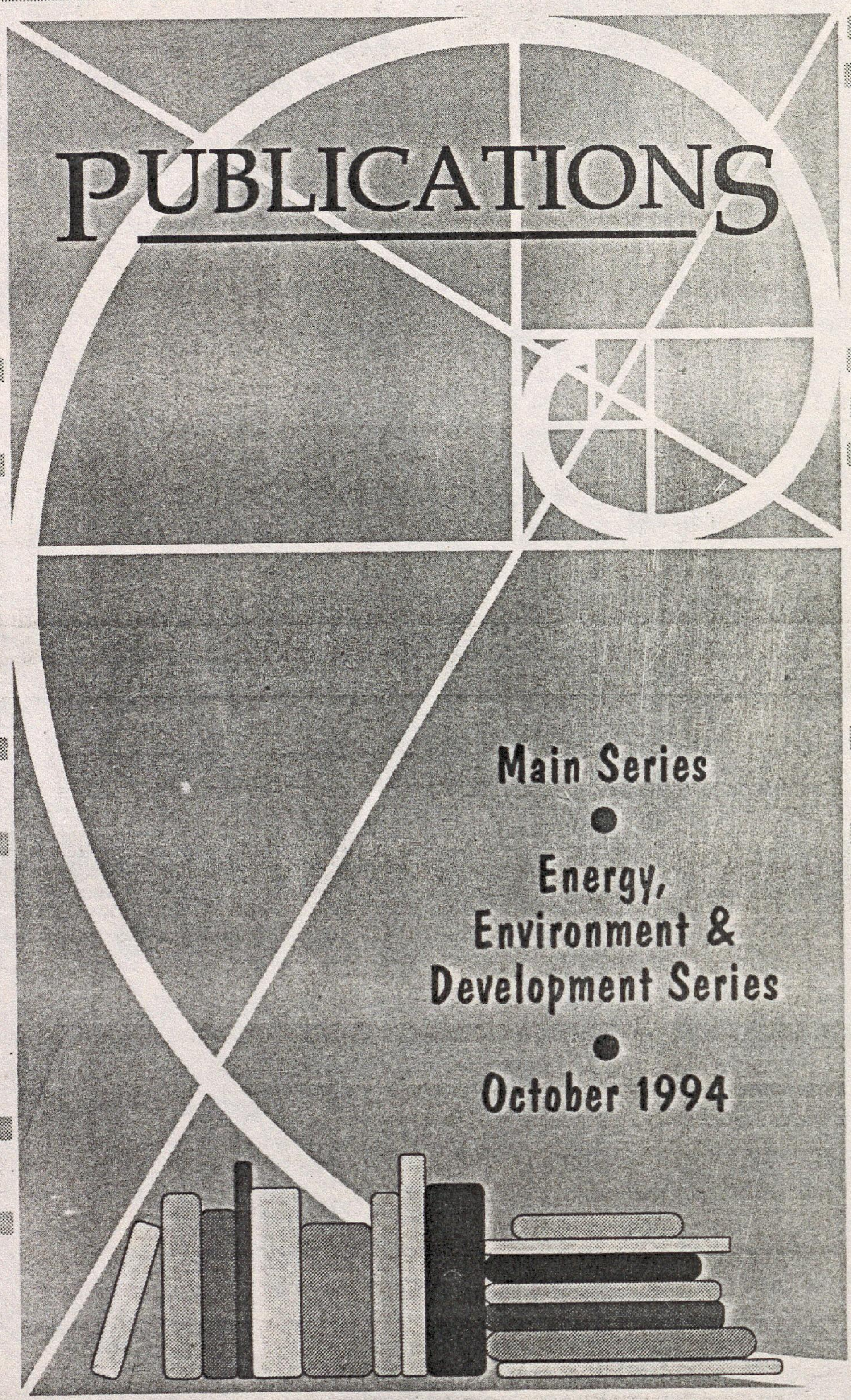
June 1995



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TO

SHRI Y. S. RAJAN
ADVISOR DST &
EXECUTIVE DIRECTOR
TIFAC

DEPT. OF SCIENCE &
TECHNOLOGY

NEW DELHI - 110016

FROM:
PROF. S. DHAWAN
7/1 Palace Cross RD
BANGALORE - 20

Confidential

To: Prof. S. Dhawan

Frm: Y.S. Rajan

Right as I have been trying to get a job for 60 students upcoming date is better

Should be Oct/Nov 1995

Y. S. Rajan
Tele. No. : 666073 (Off.)
603428 (Resi.)
DII/53 West Kidwai
Nagar,
New Delhi 110 023

My dear Prof. Dhawan:

After I met you recently, the days have been hectic. My work is going on alright. From Sweden, I ~~[illegible]~~ got a communication that they had overwhelming response from all over ~~mid~~ Europe and hence they are not calling me. I have applied for two places in India.

My interfaces with Dr. V.S. Ramamurthy are excellent; we meet often to discuss important issues; TIFAC work is going strong. Also several international recognitions as well. UNEP wants a special training programme on TIFAC based work — hence I am going to Malaysia for a week — all paid by them. (I leave 11th Morning & return on 19th Nov Sunday)

In the meanwhile I got Sh Darbari Seth's address. You had mentioned you knew him. He is still in the Tata System. His address is

Mr. D. S. Seth (Darbari Seth)
Emeritus Chairman,
TATA Chemicals
Bombay House.
24, Homi Modi Street
BOMBAY 400 001

Tel: 204 76 76
(Off)

P.T.O.

I will be grateful if you can write to Mr Darbari Seth about me and for any possible help.

For convenience I am enclosing a biodata, summaries on environmetal work, telecom, TIFAC Brochure, TIFAC three page, in case you want to send to him.

With kind regards & respects to you and Mrs. Dhawan,

Yours sincerely

Roy

[A]

June, 1995

SHRI Y.S. RAJAN
CONTRIBUTIONS AND ACHIEVEMENTS

1. Shri Y.S.Rajan has made numerous contributions to the Indian Space Programme for about two-and-half decades through his dynamic performance. He has undertaken and executed many important scientific, technical and managerial tasks for the Indian Space Research Organisation (ISRO). His key role as an organisation person at an apex level in shaping ISRO/Department of Space (DOS) has been crucial to the success of space programme. He has a unique and continuous blend of experience not only in technology development and programme management, but also in having a direct executive responsibility in all aspects of Government administration and financial managemet (from policy level to procedural execution) since 1976 in ISRO/DOS reporting directly to Secretary, DOS. He played a vital role in evolving and implementing many innovative successful projects-, personnel- and financial-management systems in ISRO/DOS. As Scientific Secretary, ISRO, he, in addition, made the ISRO/DOS international co-operative programmes with many countries a success. He has worked closely with some of the eminent Indian Scientists/technologists like Dr. Vikram Sarabhai, Prof. Satish Dhawan, Dr. Brahm Prakash, Prof. Yash Pal, Dr. Vasant Gowariker, Prof. U.R.Rao, Dr. A.P.J. Abdul Kalam - the founders and consolidators of the Indian Space Programme. Has acquired considerable administrative experience working with Shri M.A. Vellodi (formerly Secretary, MEA), Shri T.N.Seshan (presently Chief Election Commissioner) and Shri Y.S. Das (formerly Secretary, Department of Culture).

2. Since mid-1988, with his rich experience in ISRO/DOS, he has taken up an important assignment for technology development in the country as **Adviser** in the Department of Science and Technology. He is, in addition, the first **Executive Director and Member-Secretary of the Technology Information, Forecasting and Assessment Council (TIFAC)**, a unique and new institution which he has built up and shaped for about seven years under the overall direction of its Chairman/Members. The Council comprises many eminent administrators, technologists and industry persons. His vast experience in finance and administration in ISRO/DOS was drawn upon to restructure several aspects of functioning of DST as well as for review of policies of other Government Departments.

3. Shri Y.S.Rajan (52 years, date of birth: 10-4-1943) has a post graduate degree in Physics with Electronics as the Special Subject (M.Sc. 1964, Bombay University). He had a uniformly first class academic career.

4. During his initial period of professional career (1964-1969), he developed a number of electronics/microwave hardware and instrumentation required for the Space Sciences and Sounding Rocket Programme. Some of them had gone into production. He then concentrated on the system engineering of the electronics ground systems required for Indian Launch Vehicles. He was, since mid-1970, assigned some important Systems Engineering tasks for the Satellite Instructional Television Experiment (SITE), a unique experiment in the world at that time. As a first task, he was an active member of the ISRO-MIT/Linchon Study Team (in USA) for the Indian National Satellite (INSAT) for several months during 1970. He made many valuable contributions to the study and to the field of Satellite Communications in India. Later he was deputed to the Goddard Space Flight Centre of the National Aeronautics and Space Administration (NASA), USA. He was associated with NASA's Application Technology Satellite (ATS-6) project during 1970-1973. His contributions to the project were widely appreciated by the NASA management.

5. On his return to India by end-1973, for a brief period he assisted Prof. Yash Pal, Director, Space Applications Centre in organising several new initiatives beyond SITE. Since 1974, he was a Key Staff Scientist to Chairman, ISRO/Secretary, Department of Space (DOS)/Chairman, Space Commission. [i.e. to Prof. S. Dhawan during 1974-1984 and Prof. U.R.Rao during 1984-1988]. In this capacity, his contributions to planning, systems engineering and techno-management of many satellite, launch vehicle and application projects are numerous. He also played an important role in the evolution of Indian space qualifcation systems and reliability engineering (Hi Rel parts,etc.).

6. In addition to the above, as the Assistant Scientific Secretary, ISRO (1976--1979) and the Scientific Secretary, ISRO (1979-1988), Shri Rajan was the focal point of most of international co-operative activities of ISRO/DOS. His technical knowledge, diplomatic and negotiating skills and managerial experience helped in a great measure the success of the cooperative projects. He was the member of Indian delegation to the UN Committee on the Peaceful Uses of Outer Space (COPUOS) and has also led the Indian delegation on several occasions. He played a key role as a member of Indian delegation to UN Conference UNISPACE -82 held at Vienna. Through such activities he has made several important contributions to the evolution of International Space Law. He also held or is holding some official positions in the international scientific bodies like Committee on Space Research (COSPAR) and International Astronautical Federation (IAF). The rich experience was also drawn upon in DST on

various international tasks of DST such as NAM S&T Centre, Intellectual Property related negotiations, Environmental treaties, to cite a few examples.

7. Other noteworthy key responsibilties as the Assistant Scientific Secretary, ISRO and Scientific Secretary, ISRO are the interfaces with public, press, Parliament, Planning Commission and other Government agencies as well as networking of individuals within and outside ISRO and institutions. He was responsible for, in several ways, the organisation of the ISRO System for bringing out Technical Reports, Annual Reports, and excellent brochures as well as organising systematic exhibitions. He has special talents for communication of ideas to various persons: VIPs to technical specialists to - general audience, at different aggregate levels.

8. He completed the vital task of the evolution of the Space Programme Profile of 1980-90; he was the focal point in ISRO/DOS in the formulation and coordination of its cycling at various levels of ISRO/DOS and Government. He played a similar role for the Profile 1990-2000 as the Convenor of the Working Group of ISRO/DOS.

9. In the field of Space Sciences his role has been primarily in terms of assisting the promotion through involvement of several eminent national Scientists and helping them in developing necessary managerial mechanisms. Notable examples are in the programmes of MONEX -77/79; Indian Middle Atmospheric Programme (IMAP); Mesosphere-Stratosphere-Troposphere (MST) Radar; and several joint international space science experiments. Played certain special role for the Indian manned space flights.

10. Another special contribution of Shri Y.S.Rajan to the Space Applications in the country, besides his contributions in the area of Satellite Communications, under the overall guidance of Prof. S. Dhawan, since 1978 was the conceptualisation and implementation of the unique National Natural Resources Management Systems (NNRMS). This involves continual work with all the State Governments and Central Ministries/agencies. His dynamic nodal role led to the Government decision on establishing NNRMS in 1985. He stimulated through his techno-managerial efforts, the establishment of many Remote Sensing Centres in the States, Remote Sensing Units in many Central Government agencies and the regional Remote Sensing Centres. Through his sustained efforts India made a significant presence in many international forums. The two special issues of NNRMS in the International Journal of Remote Sensing edited by Shri Y.S.Rajan are

noteworthy. Indian systems for Remote Sensing have a special role to play in national development, thanks to these efforts.

11. Shri Rajan has since 1974 contributed significantly to the evolution of ISRO- Industry interface which encompasses Technology Transfer, utilisation of Industry infrastructure, etc. Of special mention are the systems for ISRO -BEL and ISRO-HAL joint efforts in the Space programme. As Scientific Secretary, ISRO he was also responsible for managing the extra-mural research funding programme of ISRO called RESPOND and contributed to establishing some special mechanisms for linkages with academic institutions.

12. An entirely different facet of Shri Rajan's action-packed career in ISRO/DOS relates to his close association and direct executive experience since 1976 with the administrative, financial and personnel policy related aspects of ISRO/DOS and the Government of India. Merit review and promotion schemes for scientists and technicians in ISRO/DOS and several other well codified procedures for career opportunities for all the staff, purchase procedures and project management systems for large projects of ISRO like SLV-3, PSLV, INSAT, and other satellite projects are a few examples. He has closely worked with some eminent senior administrative persons of India, in evolving and implementing successfully several administrative, financial and personnel related policies and procedures which are responsive to the needs of an S&T organisation within the frame work of the Government systems and "without being needlessly inelastic". He has also helped a few other Government Departments in evolving such procedures. He played an important role in operationalising Zero Based Budgetting (ZBB) in ISRO/DOS which is in operation since late seventies, well before its importance was recognised in Government. He, as Scientific Secretary, ISRO, was directly responsible for programme - budget balancing, prioritisation, project appraisal and reviews and advanced planning. He was, as a part of his direct responsibility, instrumental in evolving an excellent working system for ISRO/DOS interaction with the Planning Commission. He has also played an active role in ISRO/DOS Joint Consultative Machinery, for furtherance of welfare of the staff.

13. He has been responsible for several classified activities since mid-seventies. Many of these have resulted in good functional working systems.

14. All the above contributions would not have been possible without his ability to network with several other active and dynamic persons - at the equal level as

well as senior/junior levels. Shri Rajan has excellent communication capabilities and a special ability to interact with all levels of persons within and outside the organisation. He has trained several young persons in ISRO/DOS to take up newer and challenging responsibilities and has done similarly later at DST/TIFAC after he moved over to DST in 1988.

15. Since mid-1988, on joining the Department of Science & Technology (DST), he has actively built up TIFAC, as the first Executive Director from its foundation. Technology forecasting and assessment activities in the country have started receiving a special recognition in a number of Government agencies and industries due to his sustained efforts of organising study teams. TIFAC has now established follow up mechanisms for its recommendations resulting from its studies such as, Sugar, Steel, Performance Materials, Titanium, Composites, Instrumentation, Aviation, Human Settlement and Energy. He has also organised initiation of a pilot project on a decentralised interactive Information System on emerging technologies called TIFACLINE. The project has entered a limited operational phase. TIFAC's excellent work is also receiving several international recognition. Major technology projects in a mission mode have resulted from TIFAC work: Sugar Technology, Advanced Composites, and Fly Ash Utilisation being executed by TIFAC and on Leather being implemented by CSIR.

16. Many new viable mechanisms to link laboratories and industries have been developed to pursue the findings of technology forecasting and assessment studies and techno-market surveys of TIFAC. Special unique and active linkages are being developed with UNIDO and Confederation of Indian Industries (CII) which represents about 70% of Indian industries. With the latter the actions include promotion of technology consciousness and actions with industries. Also notable are the achievements of TIFAC in having close linkages with socio-economic Ministries/Departments which increasingly seek the advice of TIFAC and special linkages with excellent R&D institutions through Specialised Boards.

17. Noting the excellent work done by TIFAC since 1988 covering large number of areas in depth in terms of forecasting, assessment and market surveys, the newly reconstituted TIFAC Council intitiated a number of major Task Forces in Agro Food Processing, Road Transport, Waterways, Aviation, Electric Power, Telecommunication and Advanced Sensors. In addition a very major first of the kind of exercise in India on Future Technology Vision for India 2020 has been taken up through a Task Force with the 11 Panels. There is also a Task Force on Intellectual Property related activities. These Task Forces and Panels are led by eminent

industrialists and technologists. The networking requirement for these are two orders more than what was done earlier. Shri Rajan has successfully initiated these and many of the Task Forces and Panels have been working very well with reports expected during 1995.

18. Noting the work done by TIFAC, UNIDO had requested TIFAC to organise a Meeting on Cooperation in Technology Monitoring in Developing Countries. This was held during 22-25 November, 1994 at New Delhi. UNIDO papers recommend TIFAC as an institutional model best suited for the developing countries who are in the process of establishing their own technology monitoring infrastructure. Another major initiative successfully completed by TIFAC is to have the first ASEAN and India Joint Meeting on S&T Cooperation. It was organised during 6-10 February, 1995. Detailed work plan in three major disciplines, namely, Biotechnology, Advance Material and Information Technology has been identified. The successfull conclusion of this Joint Meeting is considered to be a significant step in the cooperation between Indian and ASEAN countries.

19. Shri Rajan has a unique experience of blending technology development and programme management experience with the direct executive experience in handling all aspects of Government administration (from policy level to procedural execution whether it is in personnel management, purchases or contracts) since 1976 in ISRO at the apex level of Department of Space (see para 12). This rich practical experience has been carried forward in DST. He has helped in various aspects concerning restructuring of DST and is Chairman, Administrative Board in DST. Increasingly other Government Departments/agencies derive the benefit of his rich executive administrative experience to conduct many important reviews of personnel policies of S&T personnel, e.g. Flexible Complementing System; formulation of rules for various S&T institutions, etc. He is the Chairman of an Inter Departmental Committee of S&T departments set up to consider 5th Pay Commission related inputs.

20. Since his days of corporate apex level management role in ISRO/Department of Space (DOS) (1976), he has played a key role in financial management of ISRO/DOS- from programme-budget linkages to project appraisals to financial/parliamentary requirements. He also led the analysis-cum-synthesis for all of ISRO/DOS for Annual Budgets, Revised Estimates, Five Year Plans as well as the Decade Profile which was unique to ISRO (see para 12). His experience is equally drawn for DST in a variety of ways including various preparatory actions relating to the amendment of R&D Cess Act of 1986 and the plans for its management.

21. He also plays an important overview role in DST for a number of information systems related projects (e.g. Digital Cartography Systems of Survey of India, Geographic Information Systems), intellectual property rights and international programmes. He assists Secretary, DST (Dr. Vasant Gowariker upto April 1991 and presently Dr. P. Rama Rao) in several new policy and programme initiatives. He represents Secretary, DST on many Government and other forums. He recently presented DST programme to the Department-related Parliamentary Standing Committee on Science & Technology, Environment and Forests (1993-94).

22. Shri Rajan has a rich practical experience in the initiation and evolution of data bases/information systems on technologies and related systems as well as special documentation systems.

23. He has a wide ranging experience in various aspects of environmental interfaces with technologies and also scientific aspects of environment.

24. He has a deep knowledge in all aspects of Intellectual Property Rights. Strengthened over the past five years. Was responsible for organising and bringing out practical guide on patenting.

25. He has completed a few special assignments on their invitation for United Nations Conference on Environment and Development (UNCED) and World Intellectual Property Organisation (WIPO) on Environmental Friendly Technologies and IPRs.

26. He is one of important contributors to various aspects of technology management in the country and propagating interest in key personnel in a large number of institutions/industry associations. Was invited to present a National Paper on Technology Development and Transfer in unique Indo-German Workshop during 7-10 Febaruary, 1995.

27. Assisted Secretary, DST and MOS (S&T) in the evolution of the draft for a new Technology Policy. Has an extensive knowledge in technology policy and management in other countries (developed and developing).

28. He has experience from ISRO and DST for evaluation as well as initiation of special projects for organisations such as UNDP.

29. Experience in identifying and selectively promoting key Homegrown Technologies under TIFAC; has been responsible in shaping this programme from the beginning and has introduced special contracting mechanisms. Also a member of Technical

Advisory Committee for the Programme Aimed at Technological Self Reliance (PATSER) of the Department of Scientific and Industrial Research. Advises the Risk Capital and Technology Finance Corporation Ltd. (RCTC) and ICICI on SPREAD (an R&D funding scheme - soft loan).

30. Closely associated with industry associations and organisations. Shri Rajan's advice is sought by them on many science and technology matters regularly. He recently visited Germany as a members of Confederation of India Industry (CII) Mission to R&D Centres in Germany from 7th to 12th February, 1994.

31. He is responsible for conceptualising, organising and obtaining approvals for the major Mission Mode Projects, i.e. Sugar Technology Mission, Advanced Composites Product Mission and Fly Ash Utilisation, all of them having a strong inter-ministerial participation. He has also established implementation mechanisms. He has taken a lead role in the Ministry of Steel programme to mount a major effort in Continuous Casting Pilot Plants <u>and</u> Energy Saving in mini-Steel Sector.

32. Shri Rajan has travelled widely in India (most parts) and abroad about 25 countries in <u>all</u> continents. He has excellent professional working relationships with a large number of persons in Government, R&D laboratories, academic institutions and industry.

33. Assisted Dr. Vasant Gowariker, Adviser to PM on Science and Technology and Dr. S.Z. Qasim, Member, Planning Commission in conceptualising and bringing out books on "Science, Population and Development" and "Science and Quality of Life" respectively when they were General Presidents of Indian Science Congress Association.

34. Some of the notable academic activities of Shri Y.S.Rajan are:-

(i) Co-Editing of Book on Remote Sensing published by the Indian Academy of Sciences (1984).

(ii) Technical Editor of a special issue on the Indian National Natural Resources Management System (NNRMS) in the International Journal of Remote Sensing - IJRS Vol.6, No.4 & 5 (1985).

(iii) Visiting Professor, Anna University in Remote Sensing from 1982 to 1988.

(iv) Elected Member of the Section-1 (Basic Sciences) of the International Academy of tronautics (IAA) in 1986.

(v) Member of Institute of Electrical & Electronics Engineers (IEEE) till 1992.

(vi) Fellow of the British Interplenatary Society till 1988.

(vii) Vice Chairman of a COSPAR Sub-Commission A.3 on Geology and Producitivity of the Land Surface and the Oceans, for the term 1984-1988.

(viii) Member of the International Astronautical Federation (IAF) Technical Committee on Space Exploration (since April 1985).

(ix) Member-Secretary, Indian National Committee for Space Research (INCOSPAR) of INSA (1982-1987).

(x) Member, Scientific Advisory Committee of Indian Middle Atmospheric Programme. (1982-1988)

(xi) Member of Editorial Advisory Board of international Journal of Remote Sensing.

(xii) Member of Editorial Board, Current Science.

(xiii) Life Member of the Indian Geophysical Union and recently elected Fellow.

(xiv) Life Member of Indian Science Congress Association (ISCA).

(xv) Member of Executive Committee and Executive Council of ISCA (1989 - 1993).

(xvi) Member, Editorial Board, the Journal "Space Policy", UK.

(xvii) Member, Editorial Board, Defence Science Journal.

(xviii) Member of the Executive Committee of International Association of Technology Assessment and Forecasting Institutions (IATAFI)

(xix) Life Member, Indian National Cartographic Assn.

(xx) Director, Executive Council, Indian Society for Advancement of Meterials and Process Engineering (ISAMPE) (1993-1995).

(xxi) Delivers several lectures on Technology Management in management education related institutions, CSIR training schools, etc.

(xxii) Has been an examiner for M.Tech. thesis and has guided successfully a student for Ph.D.

33. **OTHERS :**

(a) Award :(i) Received **Fuel Instruments & Engineers Foundation (FIE) Award** for 1991 for eminence in the field of Science & Technology.

(ii) Received Jawaharlal Nehru Birth Centenary Award for 1991-92 conferred by Indian Science Congress Association.

(b) Member of RC of Central Scientific Instruments Organisation (CSIO) since 1991.

(c) Member of RC the National Chemical Laboratory (NCL), Pune since 1994.

(d) Member of Sponsored Research and Development Programme (SPREAD) Approval Committee of Industrial Credit and Investment Corporation of India, since 1990.

34. **PUBLICATIONS :**

Most of the technical works of Shri Rajan are available as internal ISRO/DOS notes/memoranda and Study Group Reports. A few of the technical works have been brought out as technical reports/memoranda/papers in journals,etc. He has also delivered talks, some of which have been brought out as papers. All these would be about 100 in number.

HIGHLIGHTS OF EXPERIENCE OF MR. Y.S. RAJAN IN THE FIELD OF ELECTRONICS AND COMMUNICATION

EARLY YEARS

* Post-graduate (M.Sc) in Physics and Electronics from the University of Bombay (1964).

* Since 1964- 1966 developed in a team and successfully flown in balloon various instruments and FM/FM telemetry for cosmic ray research.

* Developed and produced S-Band radar transponders for Indian Sounding rocket programme (1966-69)

* Very early studies for Indian National Satellite (INSAT) at MIT Lincoln Laboratory; later at NASA/ Goddard Space Flight Centre for all system engineering/electronics/Communication aspects of ATS-6 Satellite & SITE experiment (1970-1973).

* Expert in Antennas; Satellite and Rocket Tracking system; Space craft technology; HiRel parts and components.

MIDDLE PERIOD

* Since 1974, at ISRO Headquarters, remote sensing utilisation; all aspects of spacecraft; ground systems; futuristic payloads; international cooperation.

* Key person for INSAT-1 definition; preparation of tender documents; evaluation; design reviews, etc.

* Represented ISRO in a number of forums of ITU; and led Indian team to the meetings of UN Committee on Peaceful of outerspace.

* Special programme direction for various ISRO electronics efforts; microwave remote sensing; mesosphere stratosphere radars; solar cell development.

* Overall in-charge for setting up various Regional Remote Sensing Centres in the country.

* Experience in frequency management/clearance, etc.

* Scientific Secretary to ISRO since 1976 (A key Corporate level senior position); key role in long term profile of ISRO. Also assisting Chairman, ISRO/ Secretary, Department of Space in the overall management of the Space programme.

....2/-

SINCE 1988 - NOW

* Technology information, forecasting and assessment in various sectors which include electronics; information technologies; instrumentation; now closely associated with Special Panels/Task Forces initiated by TIFAC for long term vision.

* Served on Special Committees of DOT for assessing various technical/managerial aspects.

* TIFACLINE interactive information system

* Member of Advisory Board for assessing R&D projects by ICICI/ SPREAD programme.

* Active in various Industry Forums on Technology and their business linkages.

* Built Technology Information, Forecasting and Assessment Council (TIFAC) from its basic foundation and made it a vibrant system in a short span of 6-7 years.

IN THE OVERALL

* Excellent Systems Engineer in various aspects of telecommunication (particularly strong in satellites; microwaves; tracking); several years of practical and top management experience.

* Excellent knowledge of Government administrative/finance/contract/personnel management.

* Technology management and excellent communication skills. Proven leadership qualities; team builder and motivator.

* Knowledge of many related subjects like Intellectual Property protection; standards; testing, etc.

* Excellent experience of international contacts; visited more than 25 countries.

* Very effective networker of people and institutions.

* Dynamic, positive and organisational goal and result oriented.

****

HIGHLIGHTS OF MR. Y. S. RAJAN'S PROFESSIONAL ACTIVITIES IN THE FIELD OF ENVIRONMENT

* His early years of research career was in Space-physics and hence has a good knowledge of atmospheric physics. This knowledge and further experience were later consolidated through his responsibilities for programme management of Space Science and Space Meteorology as Scientific Secretary ISRO (Indian Space Research Organisation).

* Specialised in Remote Sensing of the Earth since 70's. Had a special key role in introducing remote sensing applications in India leading to total system of Satellites, ground system and a network of independent application Centres. There were several environmental applications, the earliest one being the survey of forests; the technique has been operationalised. Wasteland identification is another major effort.

* Was Director, Earth Observation System of ISRO/ Department of Space. Also played a key role in the establishment of National Natural Resources Management System (NNRMS) in India aimed at integrating remote sensing with other data to lead to optimal management of natural resources.

* Established several Regional Remote Sensing Centres in India.

* An active member of Editorial Advisory Board of International Journal on Remote Sensing.

* Elected Member of International Academy of Astronautics.

* Had an active role in COSPAR. Played an important role in formulating International Geosphere Biosphere Programme in India (IGBP).

* Has been responsible for international cooperation of ISRO with many countries in Europe, North America, Latin America, Africa and Australia. Was also responsible for initiating Indo-Swedish Cooperation in Space.

* Widely travelled to about 25 countries in all continents -some several times.

* Led Indian delegation to United Nations Committee on Peaceful Uses of Outerspace for several years.

* Played a key role for the multipurpose (TV,Telecom and Meteorology) geosynchronous Indian National Satellite (INSAT) since 70's.

... contd.

* Subsequently at the Department of Science and Technology (DST) made several important contribution to mapping and digital cartography.

* Active participation in policy formulation on many Environmental issues pertaining to the country (ranging from responses to Montreal Protocol, GEF, Agenda 21, etc.)

* Member of many important Committees of the Ministry of Environment, Government of India.

* Fully knowledgeable and contributed to ocean remote sensing including marine pollution monitoring.

* Had been Specialist Consultant/Adviser to UNCED on issues relating to Transfer of Environmentally Sound Technologies and Intellectual Property Rights.

* The first Executive Director (CEO) of India's **Technology Information, Forecasting and Assessment Council** and was responsible for networking many specialist groups, industries and NGOs in Technology Forecast and Technology Assessment efforts. TIFAC has brought out more than 150 reports of which about 25 specially address environmental issues ranging from Fly Ash Utilisation, Waste Water Treatment, etc Other reports address environmental issues and a part of technology assessment.

* In addition, has launched a major joint effort on various technologies for Fly Ash Utilisation (Government - Industry- User supported).

* Has a close knowledge of the problems of industries in developing countries especially in the context of environmental issues; raw material conservation; energy conservation, etc; specialised in technology transfer.

* Responsible for several training programmes - from top corporate level to working levels.

* Several international recognitions for TIFAC's work including UNIDO, UNEP, etc.

* Excellent motivator; organiser; communicator; and networked with an established record of about two decades of institution building.

+++++++++++

TECHNOLOGY INFORMATION, FORECASTING *and* ASSESSMENT COUNCIL

TECHNOLOGY INFORMATION, FORECASTING AND ASSESSMENT COUNCIL (TIFAC)
(An autonomous body under Department of Science & Technology)
Technology Bhavan, New Mehrauli Road,
New Delhi-110 016

Tel : 6862331, 6867764 Fax : 91-011/6863866
Tlx : 031-73207 TIFA IN
E-mail : shakti!vikram!tifac.

INTRODUCING TIFAC

Recognising the crucial role of technology in the development of the country, the Government of India established Technology Information, Forecasting and Assessment Council (TIFAC) as an autonomous body under the Government of India, Department of Science and Technology, New Delhi. TIFAC started functioning in mid 1988.

The current Governing Council of the Technology Information, Forecasting and Assessment Council (TIFAC), under the chairmanship of Dr. APJ Abdul Kalam, presently Scientific Adviser to Raksha Mantri and Secretary, Department of Defence Research & Development, New Delhi, comprises 42 members who are eminent persons from the Central Government, Academia, Corporate Sectors and National R&D Laboratories.

OBJECTIVES

With a view to promoting technology in India, TIFAC has been set up with the following objectives:

i) Undertake technology assessment and forecasting studies in key areas of national economy,
ii) Technology watch on global trends and formulation of preferred options for India,
iii) Establish a nationally accessible technology information system, and
iv) Promotion of key technologies

In pursuit of such objectives, TIFAC has brought out many study reports containing information on emerging technologies which are relevant for Indian conditions, some details on technology options, market potential and other relevant information including business opportunities.

TF/TA/TMS REPORTS

More than 100 Technology Forecasting (TF), Technology Assessment (TA) Studies and Techno-Market Surveys (TMS) have been generated in the following sectors:

* Steel & Materials
* Energy
* Bio-technology
* Human Habitat
* Agro-based industries
* Pollution Control (Water)
* Environmental related issues
* Manufacturing Industries
* Bio-medicine etc
* Transportation
* Technology Planning
* Information Technology
* Instrumentation
* Sugar

Several national and international agencies have shown keen interest in TIFAC reports. Many studies on emerging technologies are underway. In addition, TIFAC has an excellent specialised library on techno-business aspects of latest technologies.

INFORMATION DATABASE

TIFAC had taken up the project of creating an on-line, interactive, spatially dispersed but universally accessible Technology Information System. A few technology databases on Energy, Composites, Non-ferrous Metals, Food Technologies, Environmental Technologies and Expertsbase and Standards base are nearly operational. The system is being introduced through CMC Ltd, New Delhi. Post-query services are being organised.

TIFAC is a National Point of Contact for European Space Agency's Information Retrieval Services (ESA-IRS) which has many technology business databases.

SPECIAL LINKAGES-CUM-IMPLEMENTATION MECHANISMS

In order to carry forward actions foreseen in the TF/TA/TMS Reports (which invariably contain specific recommendations for immediate, short-term, and long-term actions), seven special implementation mechanisms have been instituted. These are

(a) TIFAC-RCI (Research Centre, Imarat, Hyderabad)- Advanced Composites
(b) TIFAC-NAL (National Aerospace Laboratories -Bangalore) - Aviation Products & Services
(c) TIFAC-CSIO (Central Scientific Instruments Organisation- Chandigarh)-Instrumentation
(d) TIFAC-CLCR (Centre for Liquid Crystal Research, Bangalore)- Liquid Crystal Display Systems
(e) TIFAC-DOE (Dept. of Electronics) - Electronics Technologies
(f) TIFAC-CLRI (Central Leather Research Institute, Madras)- Leather Technologies
(g) TIFAC-NCL (National Chemical Laboratories, Pune)-Chemical, Membrane, Polymer and Bio-technologies
(h) TIFAC-SBMT (Society for Biomedical Technology) - Development of Pacemakers, Cardivascular Catheters, Heart Valves, Stress Test Systems, Eye Lasers etc.

In addition, there is a TIFAC-CII (Confederation of Indian Industries) MoU and Task Force to promote various industrial technologies. Also special Standing Committees have been constituted on Sugar, Titanium and Steel. Major initiatives have been taken in the area of Surface Engineering.

TECHNOLOGY PROJECTS IN A MISSION MODE

The major milestone of TIFAC's implementation efforts are the Technology Projects in Mission Mode approved by the Government of India for

* Sugar Production Technologies
* Advanced Composites
* Fly Ash Disposal and Utilisation

These Mission Projects are based on the recommendations of TF/TA/TMS studies of TIFAC.

SUPPORT TO HOMEGROWN TECHNOLOGIES

Another significant activity being pursued by TIFAC is promotion of specific Home Grown Technologies which is expected to strengthen the linkages between research institutions and industry by commercialisation of technologies developed by the institutions. 13 projects have been initially selected, out of which nine technologies already funded are "CO based chemicals", "64-Bit Parallel Computer", "CFC substitutes", "Vitamin A (based on synthetic route)", "High Energy Rare Earth Permanent Magnets", "Cobalt recovery", "High Performance Synthetic Thickner for complete substitution of kerosene in pigment printing","Rapid Diagnostics" and "Bio-Fertilizers". In addition four agreements are in advanced stage of finalisation.

Task Forces

TIFAC has set up a number of Industry led Task Forces to bring out reports on Agro-Food, Road Transportation, Waterways, Electric Power, Aviation and Telecommunication, Sensors, IPR related activities. Another major Task Force is on Future Technology For India in 2020 with 11 seperate panels.

AVIATION

Out of the series of studies on Indian Civil Aviation Industries conducted jointly by National Aerospace Laboratories (NAL) and Technology Information Forecasting and Assessment Council (TIFAC) a set of three reports full of facts, figures and insights have been brought out. These reports contain Over-View of Civil Aviation Industry, Pilot and Engineering Personnel Training and Aircraft Maintenance covering markets opportunities for civil aviation products and services.

Intellectural Property Rights

A document on Intellectual Property protection in India: A practical guide has been published joinly by TIFAC and CSIR. These contains wealth of information on Patents, Design, Copyright, Trademark and need and means of protection as such intellectual property rights in India, with specific reference to filing, protection and operation etc.

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Scientific Adviser to Raksha Mantri and
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