

K. S. W. DESHMUKH,  
INDIAN SPACE RESEARCH ORGANISATION  
ISRO

C/O PHYSICAL RESEARCH LABORATORY  
NAVRANGPURA, AHMEDABAD-9, INDIA

SEPT. 9th, 1971.

TELEPHONE : 77076, 79271-2, 77641-2 & 78929  
TELEGRAM : RESEARCH  
TELEX : 012-261

Dear Rajan,

1. Received your last two letters. Extremely sorry for the delay in replying. I was quite tied up with my next SGIC meeting scheduled to be on 10th in Delhi (having gone to Delhi on Sunday, on Tuesday Mr. Shenoy, the chairman, decided to postpone it due to some personal difficulties).
2. Regarding SGIC I have had discussions in Delhi with Shrirangan. I feel that before we meet again, we would be definitely making some progress. As you know, P & T is of the view that the costs are really the major issues and not so much the technicalities involved in the systems. In fact they breakdown the costs in three segments: (a) the incremental costs of communication transponders which I have got from Dick. (To this Shrirangan is not agreeable!), (b) cost of various types of earth stations. Recently Promod has sent some papers from COMSAT which would be very useful. In addition to this, I shall be discussing cost aspects with Dick, Wg.Cdr. Rao, Shrirangan, etc. (c) cost for switching equipment. According to P & T this cost is not very significant and hence can be assumed as certain percentage of earth terminal cost.
3. The papers that you have mentioned giving the cost data about Data Transmission via Satellite and another generalised paper, etc. I do not know whether these are the same papers that the last ones I received from you, namely; the economics model etc. At present, all the papers that you have sent (which I have properly indexed etc.) I have given to Shrirangan to go through. The first five or six papers that you have sent earlier (regarding Canadian systems). I have myself not found time to go through it in detail. The economics model papers (total 3, last shipment), however, I found quite interesting. In fact my approach would be similar like taking into account cost of capital, depreciation, maintenance, operation and thus determining cost of earth station and studying the various breakeven points with respect to channel capacity.
4. Regarding FHC, with regret, I must say that things are stagnant and we have not formally informed the engineers till todate. I firstly dislike such chaotic approach. At least I have sent a few reports to SSTC library and I have also written to individual engineers (tentatively selected engineers) to go through this stuff in great detail. We have not yet found people for Thermal, Power & Harness. Whom do you consider a better candidate (in case we any way want to sent yet another electronics man there). S. Madan Mohan Rao or Venkataiha in PRL ?

Between Narayanan and you, one would be going to Philco Ford and the other would be in FHC and then we would have a vacancy at GSFC. If I understand you correct, I think you would be the one to opt for GSFC ( and later moving over to CMO), and somebody else from India will go to FHC and KN to Philco-ford.

5. WARC implications that Vasagam had sent (yours-jointly written) I have made out copies and have also passed on to Dick. He was very keen in having NASA reactions on recent WARC decisions which I came to know Prof. Chitnis has received. Unfortunately the communications flow within ISRO being so poor neither I nor Dick (persons who are worrying about INSAT) have been able to get a copy of this. Apparently, Prof. Chitnis (he has himself told me) has not gone through them yet. I wish at least once we have a detailed discussion on INSAT frequency issues before our people are come over there. Dick has reacted to your observations and I am sure by now you would have got his letter. In my recent visit to Delhi I have procured the relevant portions of the decisions taken in WARC from R.G. Deodhar of WPC. Mr. Basu Wireless Adviser, showed unwillingness to discuss INSAT matters even on informal level indicating that SITE frequency issues is presently pending and according to him principles involved being more or less the same (to which I do not agree fully) he would discuss INSAT only after SITE frequency decisions is finalised. Can we get some experimental data or at least reasonable realistic cost estimates regarding Front-end to be developed at 2500 to 2690 MHz frequency. Chicken-mesh antenna (or whatever it might be for that frequency) being on rupee account we may not have to bother about it as much at this stage. Any changes in the cost of front-end, however, are quite important for the economics of the total system.

6. By now, I think, we would be distributing INSAT reports to various companies. I think you were present when I had shown distribution list to Dr. Sarabhai to which he agreed in principle subject to the fact that he wanted to know how many copies have been printed in all. I suppose as long as our news of distributing the copies is not going to reach various other departments in India, we should safely distribute the copies to companies in USA. I am sending you a copy of the present distribution status.

7. Would you like to confirm from the sources that you have at that end, a rouser (that I have heard from Deodhar of WPC at Geneva) that Brazil has abandoned its satellite television program and is currently planning to go via microwave links etc.

...3.

8. Do write to Dick sometime, he would feel very happy. He has been quite helpful for discussions concerning SGIC, INSAT frequency, etc. More in the next,

With cheers,

Yours sincerely,

*Sargeel*

( S.V. Deshmukh )

Encl: As above.

Mr. Y. Sunderarajan  
9861, Good Luck Road  
APT 4, LANHAM,  
Maryland 20801  
U.S.A.

I am writing to Vaan shortly an informal  
letter My cheers to him,

INSAT Transponders

Prototype and 1st Flight Unit Costs.

|    |                                   |              |
|----|-----------------------------------|--------------|
| 1. | Design, Hardware and Breadboards  |              |
|    | a. UHF Downlinks                  | \$ 506,000   |
|    | b. Front End and Telemetry        | \$ 219,000   |
|    | c. Telecommunications             | \$ 530,000   |
|    | d. Command Channels (RF)          | \$ 12,000    |
|    | e. Oscillators and Frequency Std. | \$ 8,000     |
|    | f. Miscellaneous hardware         | \$ 50,000    |
|    |                                   | <hr/>        |
|    |                                   | \$ 1,325,000 |
| 2. | Assembly                          | \$ 250,000   |
| 3. | Transponder Integration Testing   | \$ 250,000   |
|    |                                   | <hr/>        |
|    | Total                             | \$ 1,825,000 |

Telecommunications Transponders' share

|                                  |            |
|----------------------------------|------------|
| Design, hardware and Breadboards | \$ 530,000 |
| Assembly                         | 75,000     |
| Integration testing              | 85,000     |
|                                  | <hr/>      |
| Total                            | \$ 690,000 |

LIST OF DISTRIBUTION OF INSAT REPORT

Total number of copies received : 39 each of Vols. 1,2,& 3.

| Sl.no.             | Date    | Name of the person         | Vol          | Vol.         | Vol.       |
|--------------------|---------|----------------------------|--------------|--------------|------------|
|                    |         |                            | 1            | 2            | 3          |
| 1                  | 2       | 3                          | 4            | 5            | 6          |
| 0                  | -       | Mr. S.V. Deshmukh          | IV0<br>1V10  | 2V0<br>2V10  | 3V0<br>-   |
| 1                  | -       | Prof. E.V. Chitnis         | 1V1          | 2V1          | 3V01       |
| 2                  | -       | Mr. K.S. Karnik            | 1V2          | 2V2          | 3V02       |
| 3.                 | -       | Dr. Vikram A. Sarabhai     | 1V3          | 2V3          | 3V03       |
| 4.                 | -       | ESCES Library              | 1V4          | 2V4          | -          |
| 5.                 | -       |                            |              |              |            |
| 6.                 | 19-6-71 | Mr. T.V. Srirangan TRC     | 1V6          | 2V6          | 3V06       |
| 7                  | "       | Mr. K. Kathirvel           | 1V7          | 2V7          | -          |
| 8.                 | "       | Dr. U.R. Rao (RS)          | 1V8          | 2V8          | 3V08       |
| 9.                 | 21-6-71 | Prof. E.V. Chitnis         | IV9          | 2V9          | -          |
| 10                 | 13-7-71 | Mr. N.C. Shrivastava P & T | 1V11<br>1V12 | 2V11<br>2V12 | 3V03A<br>- |
| 11                 | "       | Prof. M.G.K. Menon (EC)    | 1V13         | 2V13         | 3V04A      |
| 12                 | "       | Mr. R.C. Dutt, I & B       | IV14         | 2V14         | -          |
| 13.                | 15-7-71 | Dr. B.S. Rao, ESD          | IV15         | 2V15         | 3V05A      |
| 14.                | -       | Mr. Chamanlal              | IV16         | 2V16         | -          |
| 15.                | -       | D.F.D. Joshi               | IV17         | 2V17         | -          |
| 16.                | -       | Wg.Cdr. Rao, SCSD          | IV18         | 2V18         | -          |
| 17.                | -       | Mr. Calla, MASEG           | IV19         | 2V19         | -          |
| 18.                | -       | Mr. N.V. Shenoy, P & T     | -            | -            | 3V06A      |
| 19.                | 24-8-71 | Mr. M.S. Nagarajan OCS     | IV20         | 2V20         | -          |
| 20.                | 2-9-71  | SSTC Library               | 1V21<br>IV22 | 2V21<br>2V22 | -<br>-     |
| Total distributed: |         |                            | 22           | 22           | 10         |

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TELEGRAM : ISRO  
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C/O PHYSICAL RESEARCH LABORATORY  
NAVRANGPURA, AHMEDABAD-9, INDIA

November 4, 1971.

Dear Vasu/Rajan:

I have not written to you for a long time. Enclosed are the copies of a letter to Pramod and a letter to the President of TCOM Corporation who has proposed the Balloon System. This might give you some idea about what is happening at this end.

Recently as you would notice I had been on a brief tour to ECIL, ITI, BEL & Thumba. This was mainly to give some orientation to the ISRO engineers going to FHC. I wish I had a detailed discussion with Prof. Chitnis before proceeding to Thumba. Unfortunately it could not take place. May be he did n't have time! There are very few people at this end who would like to take any decision 'on INSAT Issues'. I have seen only Dr. Sarabhai taking the decisions. As a result it is almost a certainty that INSAT will slip in its schedule. Besides, there are no regular people working on various problems involved including the urgent one's such as review of present INSAT design in the light of recent WARC decisions. (so far)

Tomorrow I am going to attend next meeting of the Study Group on INSAT Communication (SGIC). There also somehow we have not been able to progress as much as we should have been. Hopefully in tomorrow's meeting we will succeed in finalising the schedule at least to get an interim report in about a month's time. The engineers, proposed earlier to go to FHC, will not be able make it due to reduced foreign exchange proposal, I am thinking, should work on INSAT issues at this end. This would help in two ways. There would be a follow up activity starting in India and group of people can devote some time to study the urgent problems in India. Secondly this will be a good way to orient the next batch whenever they would be proceeding.

Vasu, I had a talk with Dr. Gupta at SSTC. Apparently he has written a letter to you on 1st September. He has not heard anything from you on that till to-day. May be you should send your comments on the Angular motion simulator that he has proposed. While discussing the Balloon System proposed by TCOM Corporation, I did mention your work to Dr. Sarabhai that you have sent in early July or so. I have already enclosed the proposal of TCOM (without figures - as there are difficult to produce) along with my reply. Should you be interested, you may like to persue this further.

....2.

(N.V.)  
 Mr. Shenoy has now become the Secretary of the Ministry of Communication. This I think will have a very favourable effect on the INSAT program. Communications Ministry has been quite understanding since Rangab's participation in INSAT. The final decision on the national 10 year TV coverage from the Secretaries' Committee is yet awaited.

I think considering the time frame in which we would like to launch INSAT, our approach that we recommended in INSAT Study of selecting two contractors, going through PDAB, and then ~~avoiding~~ 27 months final contract ~~may~~ not be realistic. We might now have to include the impact of frequency changes on the present design as a part of initial phase in the contract ~~itself~~. What schedule you people would like to suggest? Please do give some thought to this. I would like to discuss this when you are here.

I have not got the details of the presentation that Hughes has made to Prof. Chitnis and others on their modified design of TELSAT to suit Indian requirements. The design life of the proposal is 10 years. Cost wise it certainly should sound attractive. I do not know how we you would be able to steer through the various contenders to our INSAT design. We will have to examine alternative approaches including inviting new design from various companies. In any case I hope you would give your comments on the future course of action that we should be aiming at, both in India as well as in USA. Please do give your comments on the composition of the team to FHC ( I have not included this sheet in Pramod's letter. Please do pass on this sheet to him).

I think, Vasu, you are coming here by the end of this month. Do plan to spend at least a fortnight in Ahmedabad. While here, you can certainly stay with me. I have a lot to discuss with you. I am sure Rajan would also give you lot of material on his behalf for discussion.

With cheers,

Yours sincerely,

*Sanjeev*

( S.V. Deshmukh )

Mr. Y. Sunderarajan,  
 9861, Good Luck Road,  
 Apt. 4, Lanham  
 Maryland 20801  
 USA

To Y Sundharajan & 2/  
YS RAJAM  
9861 GOODLUCK RD.  
APT 4, LANHAM  
MARYLAND, USA 20801

SD  
407

April 7th, 1972.

Dear Pramod:

Recently you have sent many letters to Prof. Chitnis, some of which were discussed between him, Karnik and myself. Prof. Chitnis is quite tied up with many things here I prefer to write to you on some of the points at this stage. You may hear from him, too, in due course. hence.

1. About ITLU matters -

ITLU matters have been discussed over many times here. A copy of such discussions in which some decisions/guidelines for budget of ITLU emerged I am enclosing here :

- a. All the ISRO engineers in USA and Mr. M.G.S. have been paid for their health insurance. The actual policies have started 2/3 months after their landing in USA. Thus each one of you will now have to repay to ISRO amount around \$ 400. The exact amount will be intimated to you by Mr. P.M. Parikh. It is suggested that this amount instead of sending back or our arranging to be deducted from future payments to you, can be deposited with ITLU (if necessary in instalment convenient to you, all)
- b. There exist a few dollars paid to each individual on account of internal travel. For this vouchers have to be produced. It is possible that all the engineers may not have fully used this amount in which case again it has to be repaid to ISRO. Here, too, it is suggested that this can be kept for ITLU expenses.
- c. The long term decisions about ITLU will be taken soon as permanent set-up for ISRO is evolved. As you very well know, if ISRO become a department of Government, for imports and such services we will be required to use present Government channels. i.e. embassy officials only. For the present it has been decided to go ahead with ITLU till the dollar permit for Mr. M.G. Subramaniam's salary allowances expires etc. i.e. till March 1973. Till that time ITLU should try to function at the rate commensurate with funds available.
- d. The projected requirements for ITLU may be of higher order. It is, however, not possible to procure money from Ministry of Finance separately for ITLU. It is, therefore, suggested that it operates with whatever is available - and not exactly what is desired by ITLU.

From the above arrangement it should be clear that there is no immediate need to transfer funds <sup>from</sup> INSAT account to ITLU. Regarding ITLU matters, Mr. Thakore has stressed that this is strictly a 'working arrangement'. I am sure, you would be able to appreciate our 'legal' problems over here, hence generally no decision on ITLU etc. will be communicated to you by Prof. Chitnis, Mr. Thakore, and Mr. Parikh directly and on letter heads. All correspondence about ITLU's finance etc. Mr. Thakore, suggests to you, should be removed from official files and maintained separately may be as personal correspondence only.

## 2 F I Program.

- a. What is happening with the State Deptt. clearance of our engineers ? At last (thank god !) they have gone back to Thumba and resumed work fruitfully. Nothing much is happening at this end. I do not know where exactly the bottleneck lies in the case of finalising the Purchase Order. May be people concerned with it are busy with other matters. I'll try to follow it up soon as I get free from various study group meetings etc.

Prof. Chitnis does not think that talking to scientific attache, in US embassy over here will help. At least he showed relectance while we discussed this matter.

- b. Is it possible to take insurance against the likely damage to the equipment at the subcontractors while ISRO engineers will handle it ? Please explore this possibility as Fairchild Industries are not prepared to take that responsibility.
3. You write about CTS. It is very interesting. Is CTS finally at S-band or at 12 GHz ? Please do get more details <sup>what</sup> about likely training opportunities on this program. In ~~that~~ stage is CTS now ? Who should write to whom ? I personally feel we should persue this in more detail, as the technology proposed on CTS is of very much interest to us.
4. In one of your letters you mention Brazil's attempt to hire a spot beam on INTELSAT at about 4 to 5 million dollar per year. You also maintain that a copy of TELESAT is available at \$ 2.2 million I wonder why Brazilians have not thought of buying it ! May be the time-frame does not suit them. I would certainly like to know more about this copy of TELESAT. Can you give some details as to exactly when this will be available ?
5. Wg.Cdr. Rao has written a few papers in which he has given ~~a~~ detailed thought to the cross-over point <sup>between</sup> direct broad cast and redistribution (both high power and low power transmitters). It proves that direct broadcast is only an intermediate stage, for India. He therefore, suggests that we ought to go for only redistribution.

I am fully supporting that idea for many other reasons, too, I am trying to send these papers to you shortly. Dick is trying get these papers to be included in AIAA conference

as 'read' by writing to Dr. F.W.Sarles (provided at this end a single consolidated paper is prepared by combining all the three papers of Wg.Cdr. Rao)

This idea is bound to shake up many of our previous notions. It changes the entire picture very fundamentally, with my close contacts with Ministry of Communication, I also know, how easy it will be to get their support once we opt for a redistribution type of satellite. Personally what is most important for ISRO at this stage, I think, is to be able to marshall support of as many other ministries as possible, only then we will be able to push this idea of INSAT through. If we stick to our out-moded designs and certain assumptions, (such as that about revenue generation capacity of at least the first satellite). I think we will only end up in killing the program.

The satellite program can go through provided we find out independent justification (other than revenue) - and I think we can do it - several reasons - technological objectives, national goals, expected change in the economy, other 'special' needs. (remote area communication, BSF, etc.)

A redistribution type of satellite will also permit more uplinks and consequently more TV channels with adequate regional coverage - which will reduce the opposition from I & B considerably. Without the Co-operation from I & B and Ministry of Communication, it is just not possible to get any INSAT through.

6. I am also enclosing a cutting from recent issue of Nature. See how much trouble NASA could create for ESRO's Satellite. Somuch so that they have started rethinking about reviving ELDO's abandoned Launch Vehicle program. I think, while talking about single point failure elsewhere, we must not fail to learn from such situations. If they can cause trouble to Europeans, surely the Asians will get the priority!

7. About the issues that you have raised regarding import of components for ESCES, ESD etc. I think either Kiran or Prof. Chitnis would be writing to you. I don't know anything about them. Regarding the custom-built equipment for which Mr. Miller together with Narayanan proposes to undertake modifications, it is felt that it need not be done, as we do have sufficient foreign exchange to buy off such equipment directly. It will also simplify the other matters. So no modifications etc. need be undertaken (I suppose Kiran would write to you in detail)

Do keep us informed about the developments at that end. Here, all of us have kept our fingers crossed and are waiting for events to take place.

official rumour - With cheers,

Yours Sincerely,

1. ↓ Brahmpakash - (MA-BARC. metallurgy Reactor Research. - now retiring) is taking over as spin-offs Director, SSTC for next 5 years.

*Sanjeev*

(S V DESHMUKH)

2. ↓ Mr. Kulkarni - now retired as Comptroller BARC is taking over as Comptroller (in charge of all admin. & Accts.) of all ISRO units in Thumba.

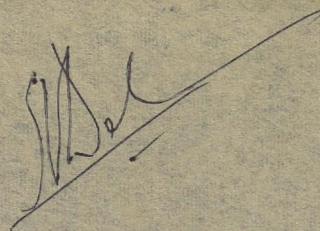
not enclosed  
Pl. refer to  
NATURE  
Vol. 236,  
17 March 1972  
"What went wrong?  
at Vandenberg?"

Note on IFLU

(Summary of discussion between Mr. S.R. Thakore, Mr. J.B. Vyas, and Mr. S.V. Deshmukh)

At present IFLU is spending approximately about 120 dollars per month. Mr. M.G. Subramanyam's foreign exchange for salary, allowances, etc. is valid till March 1973. It is recommended that we continue with IFLU for the present by keeping its expenditure at the minimum. After March 1972 we do not have separate funds available for the office expenses of IFLU, in which case it is recommended that all the engineers stationed in U.S.A. should agree to contribute 20 dollars per month towards IFLU expenses. They should be sending some voucher to cover this expenditure to the headquarters in India which will arrange to reimburse this expenditure in rupees to them. This arrangement will continue till - (a) foreign exchange permit for Mr. M.G. Subramanyam expires, (b) such circumstances which will prevent continuance of IFLU. This includes possibility of ISRO becoming a Department of GOI in which case ISRO will have to resort to the trade mission of GOI operating in U.S.A.

To : Prof. E.V. Chitnis  
Mr. P.M. Parikh  
Mr. S.R. Thakore  
Mr. K.S. Karnik  
Mr. J.B. Vyas



March 8, 1972.

P.S: - Mr. Parikh informs that Medical allowance (insurance) that has been obtained for all our engineers presently in U.S.A. for the date of entry. The actual withdrawal has, however, taken place only after a period of about 4 to 5 months. Thus, at present, practically everyone in U.S.A. has about 400 \$ to be paid to ISRO. This amount could also be utilized towards IFLU expenses. Accordingly book entries can be passed.

Yet another suggestion has been to divert part of INSAT study funds towards IFLU till they last.

To Varagum

SMS  
~~###~~  
1104

Nov. 4, 1971

SYSTEMS ANALYST

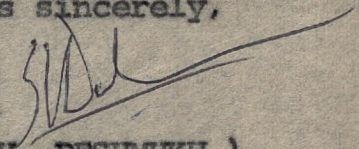
Dear Mr. Ceasro:

I thank you very much for your letter of September 7, 1971 written to Dr. Sarabhai regarding the proposed tethered balloon communications system for India. Dr. Sarabhai has passed on your letter to me for certain comments.

I have gone through your proposal in detail. Before making any observation, I wonder if you could provide us with some more information that is very vital for evaluation of such system. Please find the points on which I would like to have clarification in the enclosure to this letter. On hearing from you it will be easier to take further action.

With kind regards,

Yours sincerely,



( S.V. DESHMUKH )

Mr. Richard S. Ceasro  
President  
TCOM Corporation  
6264, Clearwood Road  
Bethesda, Maryland 20034  
USA

ANNEXURE

Following information is required on tethered  
balloon system proposed by TCOM Corporation of USA.

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1. Data regarding life of a balloon, its replacement, the replacement procedure, lead time, setting up time and procedure, etc.
2. Link calculations for VHF and/or UHF frequencies. (available signal to noise ratio at the ground terminal).
3. Cost data:
  - cost of balloon
  - incremental cost of tele-communication's package (telephony, wideband communication, etc.)
  - cost of operation
  - cost of maintenance
  - cost of spares
  - cost of the ground operations including control equipment, etc.
4. Details regarding some of the sub-systems:
  - (a) 'Power sources' on the balloon
  - (b) Details of attitude control system (compass system as mentioned), its reliability, and performance.
  - (c) Low cost front-end as mentioned in the proposal including its cost break-up and performance specification.
  - (d) Performance specification of the transceiver to be located on a roof top of a building for re-distribution of telephone channels.
5. Has the system been tested? If so, where the test was carried out, how long and what sub-systems were tested?
6. Further clarification on :
  - (a) Lightning effects on the balloon.
  - (b) Civil aviation rules, etc.
7. Details of mechanism to bring the balloon down (under control) in case of emergency, weights of the balloon and other subsystems on it.
8. Whether is it possible to demonstrate the balloon in India? How long? Will such demonstration cost us anything?

.....

November 1st, 1971

Dear Pramod:

1. I was to write to you, in fact, about a fortnight ago just before my commencing a brief tour with Dick and Johannsen (Systems Engineer from Hughes) to ECIL, BEL, ITI and Thumba. It so happened that lot of other things cropped up and literally made me impossible to give attention to any of my work.
2. Shortly Dick would be coming here and we are going to have supposed to be the final discussion on FHC matter. Dick and myself had already been to Thumba mainly to orient the engineers that were to be sent to FHC. (Though Prof. Chitnis arrived in Ahmedabad on last Monday and I left for this tour on Thursday morning, my attempts to hold a detailed discussion with Prof. Chitnis on FHC prior to my going to Thumba did not materialise).
3. According to the original proposal we would have sent 10 engineers to FHC. Just before I left for Thumba I had given a detailed letter that Dr. Sarabhai was to write to Dr. I.G. Patel (MF) in connection with the dollars involved. Having come back I understand that Dr. Sarabhai is of the view that 'cost' involved being quite large, we should cut down the programme to a more manageable size. In our meeting with him, yesterday, the decision emerged to send only 5 fresh engineers from India for this programme for 16 months. I am enclosing a copy of an enclosure of the letter that he is to write. (May be, it's not necessary now - as the latest that I heard from Mrs. Joshi, we have got the necessary FE). This gives the comparative cost aspects of sending different sizes of teams. As we would be following the alternative of sending only 5 fresh engineers, the additional manpower would be obviously coming from our people at GSFC. I think Prof. Chitnis would be writing to you about the final decision soon after our morning meeting is over.
4. Some time back Dr. Sarabhai received a detailed proposal on meeting tele-communication requirements of India by deploying huge balloon (thether) in certain phases. This has been submitted by the President of TCOM Corporation ( 6264 Clearwood Road, Bethesda, Maryland 20034). Dr. Sarabhai has passed it on to me to give evaluation and comments. On going through the proposal in detail, I found out that some important data is lacking. This includes cost details, life, reliability and maintenance of these balloons, etc. I shall

....2.

be giving a copy of my comments to Vasagam since in his report to Prof. Chitnis in July he did mention about such possibility of using balloons. I believe these people (TCOM) have already given a detail presentation about their system to AIR and Ministry of Communications ! It, therefore, means we have to critically examine this alternative so as to be prepared in any further debate regarding such a scheme.

5. Some time back while our team were in USA, D. Sarabhai had telephoned me from Bombay to give a brief to Dr. Pishorty who was included as an expert in a committee of Ministry of Finances constituted to scrutinise the dollar schemes from 1972 onwards. After 1972 onwards, all the dollar flow will be pooled in India and no project will receive dollar funds directly from any agency outside India. Apart from dollar requirements of SITE after 1972 (which amount to \$ 960 K) there were other proposals from ISRO - mainly from ESCES which required much justification and, therefore, he suggested me to coordinate this activity with Mr. Mohanti ESCES plans from 1975 onwards (after SITE). For the training proposal they require \$ 100 K while their plans in doing research in LASER Communications work require funding about \$ 400 K. It was the justification of these demands that was very important. At present there are no catalogues available here of the equipment operating in the relevant frequency (up to 400 GHz). Mohanti and myself had a hard time to give even the first order break-up of the \$ 400 K. At that time we wanted to indicate what satellites are going to carry similar experiments and what data would be available on LASER communication. At this end we do not have mission objectives of Satellites ATS further to ATS-F. I would appreciate, if you could arrange to send these to me and Mr. Mohanti.

6. Coming back to INSAT, finally Dr. Sarabhai wrote a letter to Mr. Charyk, President of COMSAT on 2nd October. This carries as an enclosure 'Profile for 10 years of Atomic Energy and Space Research'. I wonder whether this letter has reached COMSAT or not. I was away for some time, having returned to Ahmedabad I found out that the letter was not sent by Registered Post. Could you please check on it and also let me know ? I am enclosing a copy of that letter.

7. Our visit to ECIL was excellent. Mr. Warlu was, of course, very much familiar with all the problems in SITE. As a result we had very useful discussion. We had a good demonstration of their solid state modularised television. In ITI initially, Mr. Sachdev had telexed me to change our dates of visit as they coincided with the dates on which their Minister was to visit ITI. That being too late to make any changes, I stuck to my program. Fortunately, the Minister's visit was cancelled and that brought us a detail and very illustrative exposure of ITI activities and products which was actually specially arranged for the Minister. We had a very useful discussion with Sachdev. Most of the sub-systems required for ESCES modification (down converter, up converter, power amplifier, etc) ITI is already making for their Delhi earth-station which Dick was not aware of.

Their plans to undertake construction of some of the earth station equipment and further multiplexing equipment are quite impressive. At BEL we had a very detailed tour lasting about 6 hours and comprising of detailed tour from Division to Division ( 5 miles walk ! ) with their Deputy Manager (Projects) Mr. T.V. Ramachandran. Except Radar we saw all other divisions in detail. At Thumba we had very useful discussion mainly with the engineers that were originally selected to go to FHC - about ten - I personally went to various Divisional Heads also, to discuss broadly the INSAT manpower requirement, facilities, schedule, etc. The main objective of the tour was the orientation of ISRO engineers going to FHC. The other objective was to give adequate exposure to Mr. Johannsen and Mr. Dick about the existing level of technology, facilities and man-power. Both of them felt that it was extremely useful for them. In fact both of them remarked that had they come on this tour much earlier it would have been still better. Dick was particularly impressed by the level of technology at ECIL and ITI (though not so much at Thumba.) I have suggested him to give his impressions to Dr.Sarabhai.

8. Initially we had scheduled to come via SHAR complex. Just prior to my departure to this Dr.Sarabhai included me in the panel for discussion of the long term (10 year plans) of Space Research in India with invited French Professor Blamont who was to arrive here on 29th. As a result I cut short the tour and came back to Ahmedabad from Thumba. Our meetings with Prof.Blamont are quite interesting. To some of us, rest of the senior persons in the panel have already branded 'Young Turks' (for making certain radical suggestions). The Steering Committee consists of Prof.Chitnis, Dr.Pishorty, Dr.U.R.Rao and is chaired by Dr. P.D.Bhavsar. To give the efficient back-up to the Steering Committee a Secretariat has been created consisting of Dr. Hariharan, Dr. Kasturirangan Dr.S.K. Dutta and myself.

9. Our SGIC meeting is scheduled to be on 5th November. This is long over due. (It was initially to be in the third week of September.) Mr. N.V.Shenoy who is the chairman of SGIC has now become 'Secretary' to the Ministry of Communications. Lot of people including the press welcomed this move of Technical person heading a Ministry (especially Non-ICS). Within other lobby, of course, you can imagine the reaction.

10. Kiran was called back from his leave for a week to Ahmedabad. It was only through him I came to know the details about their visit to USA. (As I always maintain my thesis within ISRO we do suffer from the chronic problem of lack of communication). So much for the present.

With cheers.

Yours sincerely,

( S.V. Dasmukh )

Pramod P.Kale  
Code 460, ATSF Project Office  
Goddard Space Flight Center, Greenbelt, Maryland 20771

To Vasagam & YS  
S/N  
1104

| <u>Areas</u>  | <u>Name</u>                  |
|---|------------------------------|
| Attitude control<br>(at Honeywell)  | R.M. Vasagam                 |
| Communications<br>(at Philco-Ford)  | K. Narayanan                 |
| Communications (at FI)  | Y. Sunderarajan              |
| Attitude Control<br>Propulsion & Flight<br>Operations (FI)                | Sarveson                     |
| Telemetry & Command (FI)<br>Systems Integration,<br>Power & Harness. (FI) | Sandlas                      |
| Structure & Thermal<br>Design (FI)  | H.J. Shenoy                  |
| Reliability (FI)<br>Systems Testing<br>(preferably two people<br>at FI)   | )<br>)<br>)<br>)<br>Madhavan |

Out of the persons above, Narayanan, Sunderarajan and Shenoy are already covered for their dollar finances. So the fresh persons for foreign exchange are : (1) Mr. Vasagam, (2) Mr. Sarveson, (3) Mr. Sandlas, & (4) Mr. Madhavan.

It is felt that the 5th man to be sent should be Thermal Analysis and Control person. At present there is no nomination from Structures Division for this area.

INDIAN SPACE RESEARCH ORGANISATION  
ISRO

TELEPHONE : 7707 79271-2 77641-2 & 78929  
TELEGRAM : ISRO  
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C/O PHYSICAL RESEARCH LABORATORY  
NAVRANGPURA, AHMEDABAD-9, INDIA

July 27, 1971.

Dear Rajan,

Prof. Chitnis is just back and I have briefly discussed his visit to Washington and Geneva. On coming Friday (30th July) we are having a meeting of SGIC (Study Group on INSAT Communication). In this connection I had a talk with Srirangan. As you are aware, at this end, we badly need more literature on Multiple-access communication in order to adequately brief the Group members and then to undertake a meaningful analysis of the Indian situation.

In this connection, I suggest the following sources from which you might like to tap to get relevant material for our use. From the NASA Library you may like to find out the following :-

1. AIAA Conference on 'Communication'.
2. National Electronics Communication.
3. WESCON Symposia.
4. COMSAT documents.
5. Papers presented by Northern Electric and RCA of Canada about their system at AIAA.

You might recollect that during INSAT Study somebody I think Dick Nickelson had brought a comprehensive report of Seminar on Communication Satellite (its specific relevance to INTELSAT-IV) conducted by Hughes Aircraft Corporation. This is a thick volume and is quite useful. Dr. Greagre Andrus, at that time, had promised to get more copies. I don't know whether he got more copies or not.

Just recently I had a meeting with Dr. Sarabhai. He feels that SGIC should revise its priorities and temporarily take up the 'economies of communication capabilities' on INSAT as its first task. This exercise, if done jointly with Ministry of Communication will be quite helpful for getting a dialogue started regarding finances of INSAT both at national as well as at inter-national level.

Do you also recollect a bibliography that Kale had procured - I think through GE. This was regarding communications satellite. I did n't have much chance to see it in detail but vaguely I remember it was mostly

\* Study Group on INSAT Communication

....2.

related to the soft ware on satellite/television.  
I think this was compiled by Library of University of  
Wisconsin. Jeff took it from me which he never  
returned. Would you like to check up on that ? It  
would be very helpful if you could get that bibliography.  
I shall also trying to check up with University of  
Wisconsin Library.

*Pl. give a  
copy to Ramod*

I am enclosing the latest indentification of our  
engineers to be sent for FHC. I also suggest that you  
better write to Prof. Chitnis indicating strongly that  
you would like to go to Philco Ford (and in fact even  
Dr. Sarabhai had promised you accordingly in your <sup>that</sup>  
meeting with him in Washington.) I feel you must  
indicate your preference 'now' - do n't worry so much  
about house lease etc. - 10 other guys including  
Narayanan would shortly be coming up. Narayanan and  
Shenoy will come there earlier.

With cheers.

Yours sincerely,

*Sarjan*

(S.V. DESHMUKH)

Mr. Y. Sunderarajan  
9861, Good Luck Road  
APT 4, LANHAM,  
MARYLAND 20801  
USA.

5<sup>th</sup> Sept 72

Dear Rajan, Extremely sorry for not having written to you so long - but - somehow I get a feeling that it was I - myself who wrote to you about a fortnight back - may be from Poona - and it is your turn to write to me. In fact, I can see practically all what I must have / should have written to you.

The seminar is over. I returned after my honeymoon & on 13<sup>th</sup> June and found that ~~the~~ our study group report ~~is~~ had not progressed very much - quite contrary to my expectations. There was no much work both on home front as well as on office - that I pulled down a lot. Just before the seminar - I was down with some infection & precisely at the time when Dr. Madwar came for the first time to PRL. You can imagine how I must have felt & particularly when I had tried hard to arrange ~~some~~ a brief presentation on INSAT prog. I was bed-ridden. - Later my I recovered & got back to work with full swing - 1 1/2 week prior to seminar. My mother came on hearing that I am not keeping well. Once again I had a relapse and barely managed to attend the seminar.

The seminar is now over. Immediately after wards I had to organize some follow up meetings before PRC left - I could not take enough rest. You know the outcome of seminar already. I tried to give some very good contacts to Calla. In fact for last few months I have been helping him with outside contacts - particularly defence quite a bit. I've become unofficial salesman of MASEG - now called officially Microwave & diem.

The present status - is same - for about two weeks back - at 10 days after the seminar. ~~was~~ over. I ~~to~~ went to Poona for a week's rest. The results were far from J. Satisfy I've become more tense, but not restless and very high anxiety is

prevailing. As a result I can hardly concentrate on anything - for that matter even in the correspondence I've become very irregular and unfortunately the inflow of letters has also reduced considerably.

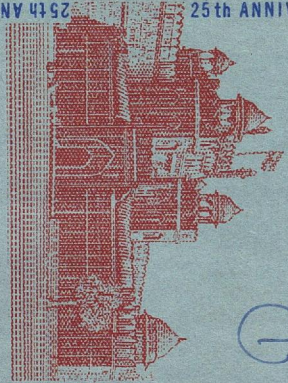
Just to tally of these days - I am neither a sad - lots of difficulties - though not all real - I am feeling obsolete - hardly any work to do. No decisions coming.

By end of this month we'll have to leave PRL premises as Lal is coming as Dir. PRL & will occupy an floor. So we shift in A'bad space complex. - now official announcements are still awaited - only 4 divisions - 1. ESCERT 2. SCSD 3. MD (Mware 4. AVID. in addition to these there will be 2 projects (1) SITE & (2) Remote Sensing. Thus the status of EVC and more or that of BSR is reduced.

FIRST FOLD

25th ANNIVERSARY OF INDEPENDENCE 1972

BY AIR MAIL  
PAR AVION  
बायैर पत्र  
AEROGRAMME



(1)

Y S RADANI  
9861 GOODLUCK RD.  
APT. 4. LANHAM  
MARYLAND 20804  
U.S.A.

OF INDEPENDENCE 1972 स्वतंत्रता की 25 वीं वर्षगांठ 25th ANNIVERSARY OF INDEPENDENCE 1972

दूसरा मोड़ SECOND FOLD

इस पत्र के अन्दर कुछ न लिखिये NO ENCLOSURES ALLOWED

भेजने वाले का नाम और पता: SENDER'S NAME AND ADDRESS:

SAHDEV V. DESHMUKH  
1500/PRL  
NHAVYRANG PUKA  
AHMEDABAD - 3800  
भारत INDIA

25th ANNIVERSARY OF INDEPENDENCE 1972 स्वतंत्रता की 25 वीं वर्षगांठ

BSR is very upset. ASC will have many functions centralized - administration, purchase, stores, transport, library, I suppose the recruitment also - Thakore will be in charge of all these. - He will certainly be most powerful person only next to the technical head / director of ASC. Nobody knows who that person will be - I am quite close to SRT Thakore - so generally get the latest gossip - Initially it was very strongly rumored that temporarily MGK will take over ASC. - not any more. (Last few days ~~Basic id~~ somehow there have been very noticeable differences in MGK's style - He is all of a sudden with changing from ~~SR~~ ISRO, - may some serious trouble with Dr. Bhawan).

The Basic idea seems to have high level person one each for science, technology & applications - Science - D Lal (PRL) technology Brahmaprakash - (VSSC) - who for applications? - nobody known. No chance for Wj cd or EVC - it will be an outsider.

Nothing is known about INSAT - I personally feel that it will go to ISRO HQ. It seems PPK will come to India by Dec. 72 - the year-end & will head like chairman. - I wonder who'll be to head that division - I wonder who'll welcome him in VSSC and no in A'Bad - once it is well - settled. No only way open will be to make up in Banga B'lore. VPK is trying hard to convince everybody he runs into that he could and therefore only he should build INSAT (without even reading any of the INSAT report or even waiting to see that his sci. sat. get is over - and this success fully). I don't think INSAT will remain with EVC. Nor do I think that

the first laurel in 76 will be possible -  
 since the decision making machinery is just  
 quite slow and lots of filters at which  
 can't be fooled especially in the absence of  
 VAS

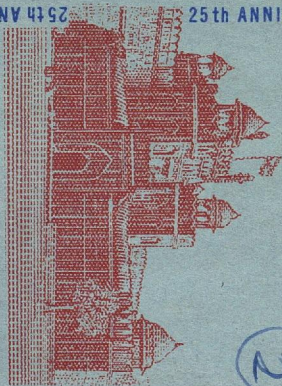
I might have to go to B'lore for  
 sec- onwards. I am not in a position to  
 think for a change (job or at project)  
 now as already too worried. I feel  
 Karu should quit INSAT. Reason on possible  
 and move to L.V. or CGI area. This case  
 is very complicated and to some extent now  
 beyond his control - being considered by  
 chairman's office - SRT etc.

My elder brother is through with all  
 formalities. Just waiting for formal RBI  
 approval - immigration and they he has got. He  
 intends to fly by Oct. 15<sup>th</sup>. Haven't heard of him  
 at all. Do keep writing. We both are fine.  
 Married life is tough. Cheers to Gomobend. Vijay  
 Sargeen

पहला मोड़ - FIRST FOLD

25th ANNIVERSARY OF INDEPENDENCE 1972

BY AIR MAIL  
 PAR AVION  
 एअर मेल  
 एरोग्राममे



2

Y S RAJANI

9861 Good Luck

APT-4 LANHAM

MARYLAND 20801

U.S.A.

OF INDEPENDENCE 1972 स्वतंत्रता की 25 वीं वर्षगांठ 25th ANNIVERSARY OF INDEPENDENCE 1972

दूसरा मोड़ SECOND FOLD

इस पत्र के अन्दर कुछ न लिखें NO ENCLOSURES ALLOWED

भेजने वाले का नाम और पता: SENDER'S NAME AND ADDRESS:

SANJEEV V DESHMUKH

1 SKO / PRL

NAVAPRANGPURA

AHMEDABAD 380009

भारत INDIA

25th ANNIVERSARY OF INDEPENDENCE 1972 स्वतंत्रता की 25 वीं वर्षगांठ

4<sup>th</sup> Oct. Wednesday

Dear Rajan, Many thanks for your recent letter. Vam is not here - He has been away - initially<sup>he</sup> was invited to Bangalore to listen to Dr URR's presentation - I had also suggested him to take up his own car and to ask Dr Dhawan to give some time. He has not yet come back but what I heard - he did get some time with him and his car seems to have been settled. Vam will now proceed to Mumbai & will take up USSR launch vehicle based study.

I was not here for some time - about a week. It was last Tuesday that I received a telegram from my brother that he has decided to fly to USA on Thursday Night. I imdtly rushed to Poona - barely managed to reach by Wednesday A.M. - My brother (He is elder to me - has just finished M.E. in elec. engg. - control systems - has been lecturer in engg college Poona) - had not even thought of what to take with him. neither - he had bags. So I was on the move - firstly went out & bought some bags/suitcase - then made a list. I was quite worried as he is of shy type and has not travelled ~~at all~~ much even within India. I gave him some travellers cheques too.

The very next day early morning we left for Bombay. He is now in US. I went back to Poona and waited anxiously to hear his arrival reaching NY safely. - A month later the cable came on Sunday morning from Philadelphia - his final destination that he reached.

I wonder if you could contact him on phone and just ~~ask~~ ask about how he is doing and if ~~any~~ any help. He is putting up with one of his close friends (his wife is a good friend of mine - ) His current address is 201 ERICA ST, PHILADELPHIA Pa. 19116, Care of Mr Sudhakar Ratnaparkhi. My brother's name is Anil Deshmukh. I guess the telephone no. is 215-934-7162. I hope he finds a job soon. He has left his wife and a little daughter over here - They intend to join him after he settles down here.

My personal front is O.K. In scarce economy like India one hardly expects any luxuries. Money seems to be plentiful let alone any luxuries. Money seems to be the biggest problem. After a long struggle (since June)

I just managed to get the cooking gas. 25% is spent on rent 35-50% is spent over food - and the rest goes in procuring other supplies. No savings at all! Rather hard life. Makes me feel like to get away from everything. Kirti is a big solace - quite patient with me and is also manages to be very cheerful and happy. Of course, of course many arguments - primarily due to my short temper.

(---) Her's friend. I just now talked to Sivangan. He still does not know about your likely post on INTELSAT etc. but I think it will be discussed after mgc's return to India. Some action on satellite plan at PdT end. - notes being circulated. I feel they are more active than we at ISRO )

I am at Erumvach - camping - there for past several months. Don't know what's happening - what's in future. May be after PPI's return to India I'll have to move to Bangalore. I talk a lot with SPN. Call - we are good friends. Both of us feel that you could possibly come back and join MD - in division of start work on Xponder. Shall write again. - with love to you, gamma & vijaya. - Sanyal

FIRST FOLD

BY AIRMAIL  
PAR AVION  
एरॉटै पत्र  
AEROGRAMME



Y S RAJAN

9861 Good Luck Rd.

APT 4, LANHAM

MD 20801

USA.

द्वितीयांशः  
दूसरा भाग  
SECOND FOLD  
NO ENCLOSURES ALLOWED

भेजने वाले का नाम और पता: SENDER'S NAME AND ADDRESS:-

SANDEEV V DESHMUKH

ISRO/PRL

MAHARANGPURA  
AHMEDABAD - 380009

भारत INDIA

Thursday Morning  
Office 9 am.

Dear Rajan, will you excuse me for this inordinate delay in writing to you? At the outset let me thank you for having sent a - cute card! Everybody down here appreciated it a lot - especially your idea of marking it 'Preliminary'. Thanks a lot. I have been wanting to write to you since long but some-how things at this end make me so uneasy that I am unable to write to anyone there are several things that are disquieting.

On the official front is the total blockade and heavy lithargy in taking any decision. I am getting totally disgusted - may be I won't be able to continue to work - or at least pretend to work like this any longer. I had tentatively put a dead-line - say around Sept. to quit the project or if necessary ISRO itself now as I am seriously thinking of proposing it.

EVC is too damn coward - and does not want to take any initiative - in fact recently I was in Delhi - to Dr. M. N. Murali - who is now in Electronics Commission - and almost right the right-hand to Prof. M. G. Menon had asked me if I could deliver a small presentation about satellite to defence people - mainly signals. I agreed and took Van with me - EVC was getting too uncomfortable I also bid him that I want to hold discussions with min. of communication - he did not like it - but as he himself would remember Dr. V. S. had told me to do so in front of him? After proposing my Delhi trip he (EVC) said ~~that~~ I should - it which I had also shown a proposed meeting with Ashok Panthasarithi - EVC humiliated scored it off and told me to not to take initiatives

I think that was the last blow. I hate to

work with people who have no guts, no initiative  
and who are so thoroughly incompetent for  
their job - on top of it they preaching me  
to ~~be~~ not to take initiatives - Rajan, it's  
intolerable.

## EVC is so afraid that he  
does not even ~~talk~~ try to talk to Mr. K.  
Menon. INSAT is totally cold-shouldered -  
No actions on the Internal Memorandum  
that I've circulated - there has been  
so far no comments. Any attempt on my  
part to generate discussion on INSAT is  
never well received. Till now there was  
at least one person who would listen  
sympathetically and if the ideas are good  
would encourage - now that (VAS) has also  
gone - what is left is incompetent sound  
of hypocrites.

ISRO is really lucky so far that  
no PAC or any M.P. has asked questions  
about how public money is getting squandered.  
It's really disgusting to see the way  
people are blying around for silly things.  
EVC goes to Bombay comes back for a day  
to A'Bad because it's holiday - by  
an - next morning goes to Bombay - and  
same bund preaching others about  
economy. I can't stand this any more.  
Sondhi - same thing - his home telephone  
bills - all declared official are  
amounting to Rs 2000 for 3 months -  
out of which about 1 1/2 month he was  
not in Ahmedabad - Nobody raises  
any voice - again public money.

Hisq. may be shifted to Delhi  
or Bangalore I don't know where I'll  
go - EVC is still in PRL. ISRO  
re-organization is going on. Dr Kamla  
Chandhry - professor at IIM is doing it.  
The new permanent chairman (probably  
Dr Dhanwan - ) when he will take over it

not known. Nobody is taking any decisions. Everyone is worried about how to consolidate own position. EKC, Bhargava, SRT - all of them trying busy in playing politics about ~~an~~ against each other who is interested in INSAT.

The other favorite activity is reading, reports, papers - all unproductive, unless and unrealistic work. It is getting on my nerves - If I continue to be this - in this environment - Even at home I can't escape discussing or having made to listen ISRO things because of Vasu. A stage has come when I tell him that I really don't want to talk about ISRO - yet he take it lightly.

Come to personal front - I am getting married on May 18<sup>th</sup> in Poona - before taking leave is looked down upon as some sort of criminal act according to funny norms that are here - you know that very well.

Just recently our land lord came and announced his intention of selling off the place in about 2 months. - That has added one more uncertainty to my chaos. Look for new place. Try for gas connection everywhere. Dishonest people preaching economy - going to Delhi - spend have to spend money on transport - not reimbursable - other people squander hundred times that money & under all sorts of official categories.

3  
This job, project, house, - uncertain. My elder brother is trying to go abroad and is going face immigration interview shortly. That I have suggested him to push off a room as possible after my marriage on 18<sup>th</sup>. May be by 25<sup>th</sup> May or so he should leave for USA. I hope his medical exam on 8<sup>th</sup> ~~May~~ & interview on 13<sup>th</sup> April goes successfully. I really

wish that he esp escapes from here - have a try  
at new life. But he is of a little nervous,  
type and needs pepping up. When he is  
through everything I'll again write to you  
about him. Insh'Allah he is to come alone  
and will proceed to Philadelphia to his  
(X mine) friend.

For this means I'll have to worry  
about my parents and a younger brother in  
Poona - new arrangements will have to be  
devised.

Another dimension to worries  
and uncertainties. To complete the chain  
sent week when I went to Poona for  
2 days I heard another  
disturbing news - ~~my~~ Doctors have suspected  
early stage of throat cancer with my  
father - My elder brother has become  
quite nervous. I have to face it now  
more boldly - He is to be taken for  
radiation treatment to Bombay  
beginning 3<sup>rd</sup> April. Much will depend  
now it all proceeds.

So perhaps now you would  
excuse me for all the delays in replying  
to you. I am trying my best not to  
get overcome by the circumstances. But  
everywhere internal courage alone may not  
help. Any amount of sincerity and realism  
in the job is not being rewarded - I am  
on the verge of blowing up. May someone  
- even God - help me.

Yet again, I'll face it. In the  
weeks to come I shall try to give you an  
account of my struggle - Do keep writing.  
My kind regards to Joma

X vijay, 1955

Your Sincerely  
Sanjay

20<sup>th</sup> Jan Thursday

Dear Rajan, At the outset let me offer you my sincere apologies for not having written to you earlier - many reasons - though I would not like to elaborate. Your assumption of things are OK with me here was totally wrong. I was under extremely heavy mental strain due to many problems - a great number of them on the personal front and quite a few on the office side. Besides all this my health had gone down - coughing all the time for over a month - all this resulted in so much demoralization that it is even though now it might look foolish and very much unwise - I do considered very extreme action to put an end to all this misery. ~~Now~~ It was very painful time - too painful to consider any other ~~in~~ problems - especially at the time and as a result my productivity of last week ~~was~~ <sup>was</sup> foot right or so was either zero or of the negative.

Now things are in better shape. Last two days I was away for Ahmedabad and just this morning I am resuming my work in a little cheerful mood - quite contrary to past few days. I will write to you a lot many letters in - these two-three days.

Let me take everything that you've raised one by one. My immediate reaction to your last letter was to give you at least a very little idea about the heavy uncertainty prevailing at this rate. - but I could not do so for the simple reason that I did not have any plans at hand to write to you. Every tip of authority of ISRO is thoroughly all ~~at~~ <sup>in</sup> ~~the~~ <sup>the</sup> ~~hand~~ <sup>hand</sup> ~~of~~ <sup>of</sup> ~~the~~ <sup>the</sup> ~~authorities~~ <sup>authorities</sup> ~~and~~ <sup>and</sup> ~~no~~ <sup>no</sup> ~~body~~ <sup>body</sup> ~~is~~ <sup>is</sup> ~~in~~ <sup>in</sup> ~~any~~ <sup>any</sup> ~~position~~ <sup>position</sup> ~~to~~ <sup>to</sup> ~~write~~ <sup>write</sup> ~~to~~ <sup>to</sup> ~~you~~ <sup>you</sup> ~~at~~ <sup>at</sup> ~~the~~ <sup>the</sup> ~~present~~ <sup>present</sup> ~~time~~ <sup>time</sup> ~~and~~ <sup>and</sup> ~~no~~ <sup>no</sup> ~~program~~ <sup>program</sup> ~~is~~ <sup>is</sup> ~~being~~ <sup>being</sup> ~~considered~~ <sup>considered</sup> ~~at~~ <sup>at</sup> ~~the~~ <sup>the</sup> ~~present~~ <sup>present</sup> ~~time~~ <sup>time</sup>.

not clear what monthly...  
 DAE or NCST or defence? who is  
 the real chair man? what will be his  
 orientation? — more towards defence or  
 just policy? wait & watch for a year  
 or so till he gets a clear idea about  
 all the currents & policies of ISRO's  
 position in a or in other ministries?  
 Will ISRO become a govt dept? — what will  
 be the flexibility of? Will all the activities  
 can continue? When will be the ISRO  
 H.Q.? A Buid on Barabari or Delhi?  
 How many ISRO divisions will first variant?  
 — including ITLV? — what is the aim  
 of maintaining ITLV when no significant

पहला मोड़ FIRST FOLD



① Y S RAJAN

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दूसरा मोड़ SECOND FOLD

इस पत्र के अन्दर कुछ न लिखिये NO ENCLOSURES ALLOWED

भेजने वाले का नाम और पता: SENDER'S NAME AND ADDRESS:-

SHANDEO V DESHMUKH

ISRO / PRL

INDIAN AEROSPACE

ANAND PRAKASH

INDIA