INTERNATIONAL COMPARISON OF SPACE EFFORTS

COUNTRY	GNP in billion $ 1977	Per Capita G N P at current prices in $	Total outlay since inception on SPACE in billion $	Average Annual outlay on Space	Average Annual outlay on R&D in billion $	Per Capita expenditure on R&D in $	Per Capita expenditure on Space in $ (per year)
USA	1826	8493	94	4.94	46	214	23
USSR	600	2330	94	5.00 (approx)	30	120	20
Germany (Federal Republic)	385	6224	2.2	0.16	7.3	118	2.6
France	288	5518	2.1	0.15	5.1	96	2.8
Japan	567	5238	1.5	0.14	11	100	1.3
China	260	323	N.A.	N.A.	N.A.	N.A.	N.A.
India	100	167	0.25	0.02	0.4	0.66	0.03

(140)

NOTE: These projections are made on basis of information from the following sources:

a. The future of the US Space Programme - Arthur L Levini.

b. Statistical year book of the Council for Mutual Economic Assistance.

c. Handbook of Research and Development Statistics 1974-75, Government of India Department of Science and Technology.

d. Records and Statistics - Quarterly bulletin of the Gastern Economist.

e. Space programme of the Federal Republic of Germany, 1976-79.

f. Space in Japan - 1972-73.

APPENDIX - 1

PROJECTED OUTLAYS FOR SPACE ACTIVITIES IN INDIA

(Figures in Rs Crores)

(Includes Plan + Non-Plan)

ACTIVITY	Investment upto 1978	1978-83	1983-88	1988-93
1. ISRO/DOS R&D Project + maintenance of the Space Centres	320	388	430	630 (330)**
2. Procurement or establishment of operational Space Segments (e.g. INSAT-1) (Paid for by users or Service Sector of the Government Budget)	20*	115	155	400
3. Investment outside ISRO/DOS for Space Segment utilisation including experimentation.	-	143	115	100
4. Investment by Defence for their Space System	-	50	140	300
5. Critical investments required in the country to make the Space programme effective (e.g. investment in micro-electronics, Hi-Rel components etc outside ISRO/DOS)	-	50	50	70
	340	746	890	1500 (1200)**

* ARVI and Dehra Dun stations are shown under this.

** Without a manned flight (See para 7.1 of the text).

(402)

APPENDIX - 2

OPTION I GNP growth at 4% per year
R&D share of GNP is 0.5%
ISRO's share of R&D money stays constant at 12% of total R&D money.

(Fig in Rs Crores)

	1978-82	1983-87	1988-92
Average G N P	93,092	107,920	125,109
Average expenditure on R&D	465	540	626
Total expenditure on R&D over five year period	2,327	2,700	3,128
Total expenditure on ISRO/DOS	279	324	375
Amount required for the Space Programme* (including service sectors and military)	746	890	1,500
	[388]	[430]	[630] or [330]**

OPTION II GNP growth rate of 10%
R&D share of GNP is 0.5%
ISRO's share of R&D money stays constant at 12% of total R&D money.

(Fig in Rs Crores)

	1978-82	1983-87	1988-92
Average G N P	106,900	172,164	277,272
Average expenditure on R&D	535	861	1,386
Total expenditure on R&D over the five year period	2,673	4,304	6,932
Total expenditure on ISRO/DOS only	320	516	832
Amount required for the space programme* (including service sectors and military)	746	890	1,500 (1,200)
	[388]	[430]	[630] or [330]**

* Show investments in ISRO/DOS R&D and maintenance of Space Centres. Rest of the money is for operational systems to be paid for by Users and other Departments.

** If manned programme is not undertaken, ISRO/DOS budget will wind down to Rs 330 crores.

(1463)

APPENDIX - 3

(1404)

R E F E R E N C E S

Ref 0 NASA POCKET STATISTICS - October 1, 1976

Ref 1 RUSSIA'S SPACE FUTURE - an article by Academician Boris Petrov in 'SPACEFLIGHT'

Ref 2 STAFF REPORT on SOVIET SPACE PROGRAMS, 1971-75 Volume I, by the Science Policy Research Divn., Congressional Research Service, prepared for the Committee on Aeronautical and Space Sciences, United States Senate Chapter One 'Overview, Supporting Facilities and Launch vehicles of the Soviet Space Program - by Charles S Sheldon II. (pp 17)

Ref 3 A FORECAST OF SPACE TECHNOLOGY - 1980-2000 a NASA publication dated January 1976

Ref 4 ESA: Uncertainities over the production of 'Ariane' and the Telecommunications Satellites - an article in Air & Cosmos 698 dated 24 Dec 1977, translated from French.

Ref 5 FIVE YEAR PLAN - 1978-1983 - document generated by the Department of Space, Govt of India, dated November 1977.

-X-X-X-

~~(1405)~~
(1404 a)

EPILOGUE

Even some of those who have at best
Give short minutes left to live - no more,
Toil and moil without a minute's rest
As if they had some hundred years in store,

While snowy peaks, coeval with Creation,
In silence stern regarding petty Man,
Stand frozen still in mournful expectation
As if but five more minutes were their span.

* * * *

Stop boasting, time, that men are but your shadows
That all their grandeur just reflects your own.
'Tis men that lend their glory to their epoch,
Aye, men illumine time with their renown.

Be grateful to the poet, thinker, hero,
Who sheds on us the light of soul and mind.
The everlasting brilliance of an era
Emerges from the beacons of mankind.

- RASUL GAMZATOV, a Soviet poet.

(1405)

I forgot what happened to it. I checked with Chandra. He said that SD told him that it was not going to be taken up now. ~~Aims~~ He did not tell him precise reasons. That is why perhaps I had erased it out of my memory!

~~In~~ One major reason might have been increasing political uncertainty in Delhi then mid-1978. The ruling coalition was in ~~a~~ bitter and chaotic internecine fights. PM's authority was being eroded by his senior Ministers openly talking things against him & telling their own policies. The draft necessarily address 1978-83 1983-88, 1988-93 (15 ~~f~~financial years). ~~They~~ It had

(1406)

also provided for Military satellites.
It also raises some realistic orientation
needed in foreign policy to reap
benefits from India's progress in Space.
There were also a number of elements
brought out for discussion.

When a Govt in Centre (PM)
was not ~~sure~~ sure of next 15 days,
where is a 15 year profile. Therefore
Cab Sec, Prin. Secy & PM may not be
receptive. ISRO Centre Director's never
thought about these issues; they
were busy with their own works,
budgets, hierarchies etc!

I played a crucial
role in making 1980-90 Decade
Profile presented by SD and also (1990-2000) Profile
before I left ISRO presented by UKR.

(1407)

But none of them (though they contained more technical details) addressed policy issues as ~~IS~~ Chandra + YSR draft sent to SD.

I read the final page — ~~a~~ Poem by ~~of~~ Rasul Gamzatov a Soviet Poet It has some lines:

"Stop boasting, time that men are but your shadows
That all their grandeur just reflects your own
'Tis men that lend their glory to their epoch
Aye, men illuminate time with their renown

Be grateful to the poet, thinker, hero
Who sheds on us the light of soul and mind.

(1408)

The everlasting brilliance of an era
Emerges from the beacons of mankind."

When I read it now, I can hear the loud laughter by Time!

But it was not only on that particular draft being consigned to ISRO files, there are many other things I was involved in ISRO, and many more when I left ISRO ~~into~~ ~~at~~ 1988 - onwards.

Even after I was with ISRO during 2010-15 (@Bangalore) as Distinguished Professor leading ISG etc and later advising Chairman ISRO, MF, AS etc, I found that there were a number of missed opportunities.

May be I am unrealistic or think too much ahead of time!
Or India is not capable of doing things like Israel, Taiwan, ~~..~~ Japan, Korea or China!!

(1409)

Another item involving long term approach but to act at a meso-level ~~to~~ first was to communicate with the Group Directors of Centres – just ~~to~~ below the ~~the~~ Directors. They were senior people having the experience of execution and were also having strong opinion of many matters. They were not in tune with many of the ideas of SD as policies. While Chairman ISRO was accessible, ~~there~~ there were no structured meeting with Group Directors. So his communication to them was through Directors of Centres, or some office orders or in review meetings where about 100-odd persons at all levels will be there.

(1410)

In such meetings SD also had a habit of not being very specific — on the one hand; on the other hand types of messages etc.

So when he expressed a desire to meet Group Directors I had made a note where I tell about his style bluntly and ~~suggest~~ giving some suggestions. I had made a questionnaire with the help of P. Sudarsana who had bright clear ideas on management of ISRO and within ISRO

That is kept as serial no. below

An

→ 1411 – 1416.

(141)

ISRO HEADQUARTERS

CONFIDENTIAL

For: Prof.S.Dhawan
Chairman, ISRO

From: YS Rajan 31 July 1978

Sub:- Chairman's meetings with the Group Directors/ Senior Scientists/Managers of ISRO.

1.0 While discussing various issues connected with ISRO Council etc Chairman expressed the desire to have meeting at the Group Directors' level to have a day long discussion with them to get a feeling of their thinking and also to express Chairman's thoughts on some policy matters to them.

2.0 I personally think that this is long overdue and the channels of communications between them and Chairman have become very noisy. Chairman's thoughts on policy issues go to them in various garbled forms. Whenever Chairman conducts reviews, visits Centres, etc, the focussing on issues is normally blurred as the visits necessarily has to be on specific items and therefore a random sampling of the whole. While trying not to be harsh, it is also time Chairman express his views clearly and without undue contradictions (which keeps others vague and guessing). It is also important that their practical problems and views are heard and understood.

3.0 Earlier Chairman desired an agenda. I made considerable thinking on the subject along with some ISRO HQ colleague (P.Sudarsan). An agenda will constrain persons and also to generalise specific issues without hearing them first may cut off lots of information. Therefore I am listing a series of questions which can be sent to the Group Directors who can think on the answers from their own view-points and experience and present briefly their ideas in writing and in words to Chairman. Then discussions can concretise some issues of general nature and some of specific nature,

(412)

<u>which should be brought out at the end of the meeting to get a general "consensus".</u> Then for future meeting some of these can become agenda items.

4.0 It is with this in view I am placing a draft letter for Chairman's consideration. From the Centres the following persons may be called.

VSSC :	Director, VSSC All Group Directors The two General Managers Project Director SLV-3 Controller, VSSC
ISAC :	Prof.U.R.Rao Shri R.M.Vasagam Controller, ISAC + one more (?)
SHAR :	Director, SHAR Shri R.Jeyamani + one more (?) Controller SHAR
SAC :	Prof. Yash Pal Prof. Bhavsar Prof.E.V.Chitnis Shri OPN Calla Controller SAC
PRL :	Prof. Lal

It is necessary to mention names; otherwise Directors may bring many others & the meeting could become something as it is for Budget reviews

Rajan
3/7

5.0 A quick view by Chairman on the subject will be useful. If Chairman approves of this idea, the Draft letter may please be cleared.

Regards

(Y.S.Rajan) 31/7/78

(1413)

DRAFT FOR APPROVAL

Dear Directors,

Since our Organisation has grown and has become considerably complex in its structure and tasks, it is getting increasingly difficult for us to maintain feedback channels within the senior management. I have therefore been thinking of holding a meeting with senior management personnel of ISRO once in six months. These meetings will be in addition to the ISRO Council meetings and I believe that the feedback available thereby will be valuable to the functioning of ISRO Council.

In the first instance, I thought it is better to raise a few questions for which each senior manager/scientist proposes his own answers/solutions generalising from his own experiences. These could be sent in a brief written form and can form the basis of the first meeting. Later on, one could focuss on a few issues as agenda items for the future meetings. A set of such questions/issues are given in the Appendix. The senior scientists could add some more if they desire.

The scientists/managers from your Centre who would attend the meeting besides you are:

...2/-

(1414)

1)

2)

3)

4)

5)

I tentatively propose the first meeting on----------

Yours sincerely,

(S. Dhawan)

(1415)

APPENDIX-1

A list of questions/issues for ISRO Council meeting with the Senior Management Personnel of ISRO.

1. How are the current ISRO projects progressing? What is your assessment regarding the success of major projects of ISRO and their schedules?

   If you foresee problems what are the suggested remedial measures?

2. Are we equipped now to take up the major projects envisaged in the next five year plan? If not what actions need be taken, and when?

3. Are we good in our technology development programmes? How have the divisions and projects contributed to this? What are your views on indigenisation?

4. What do you see as the role of administration? Are things going well in this front? What is the role of administrative staff? What are their problems and suggested solutions?

5. Is the system of reviewing and evaluation of on-going activities and the proposals for future activities sound? What are its defects? What are the suggested remedial measures?

6. Are you satisfied with our budget forecasting and control methods? Any suggestions?

7. Are the ISRO Centres getting compartmentalised? What is your assessment about the inter-Centre coordination? Any suggestions?

(1416)

8. Is our method of rewarding good workers - technical, scientific and administrative - satisfactory? Suggested remedial measures?

9. What do you think is the general image of the Organisation - within and without ISRO? Any suggestions on this?

10. What are your views on our international cooperation? Have they been beneficial? Are they structured or random? Any suggestions for changes?

11. Are our manpower utilisation policies and practices working? Any suggested changes? Is the policy of restricting manpower growth within ISRO sound? If not what do you recommend and how should it be implemented?

12. Are you optimistic about our becoming a systems management organisation leaving the production including prototype development to the industries? Is this desirable? Would this call for reorganisation of ISRO structures? How and when?

13. What do you think is the future direction of the organisation - to meet the user needs, to channelise its technology potential, to conceive and operate operational systems, etc.

(1417)

Unfortunately, no action took place.

The note about some suggestions for speeding up decision making within ISRO ~~We ha~~ It is a note dated 13/7/78 typed. We had referred about it earlier. ~~Cho~~ SD had given it back to me and asked to ~~see~~ give to him on his return from trip abroad.

I did that vide a slip dated 30/7/78 along with the original note.

Add

1418 – 1423

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ISRO HEADQUARTERS

MINI MEMO

SOON

To: Chairman ISRO

Chairman has seen this note. He said that he would discuss this in detail on return from abroad. Hence it is put up for instructions.

Regards

30/7/78

FROM : YS Rajan

DATE : 30/7/78

(1419)

ISRO HEADQUARTERS

Sub:- Some suggestions for speeding up decision making within ISRO/DOS.

Chairman may please consider the following points which are suggested in order to move things relatively expeditiously. (I briefly discussed on this with Chairman today). In view of the fact that ISRO programmes have become complex and bigger and more so because of the added complexity of INSAT programme which cuts away quite a bit of time of Chairman, ISRO in his capacity as Secretary, DOS, it is now considered essential that some sort of structured delegation have to be done on various issues which need action, coordination, some decision making, doing ground-work, etc.

It will be difficult to issue all these as Office Orders since the programmes requirements go on changing month to month and quite a bit of understanding would be required to meet the changing circumstances. Therefore I am noting below some immediate issues on which Chairman may consider / give instructions, so that things are kept moving until alternate arrangements are made.

Item 1 COSPAR matters

I have sent a separate note requesting Chairman to consider delegating decision-making combinedly to Prof.U.R.Rao, Prof.Bhavsar and possibly myself and one of us will formally communicate such decisions. Chairman has already approved action. On Chairmanship of Vikram Sarabhai Symposium, we will await Chairman's return.

Item 2 Technology Transfer

There are many items which require dialogue with companies like HMT, BEL etc. In many cases these are required only for prior planning. One example I would cite as under:

From SAC they have suggested to Dr.Siddhartha that there is a good possibility of marketing about 300 terminals for C-band receiver only terminals in USA itself. (They have quoted some

...2/-

(1420)

references). SAC desires to know whether ISRO could explore such possibilities? This obviously would mean getting into some details and discussing with ITI, BEL etc. to know their interest and coordinate with Department of Electronics, etc. Only after such planning, decisions have to be taken. For such planning purposes, broad policy indicated so far by ISRO/DOS, such as our desire to promote indigenous technology jointly with industries etc could be used for approximate commitment which will be formalised at a later date at higher levels depending the scenario emerging from details. In the present mode of working, when such issues come, it is put up to Chairman with suggestions after which letters go to Managing Director ITI, etc; then after reply comes from them Chairman initiates action. This leads to delays and many a time things are overtaken by time. A procedure Chairman may consider giving effect to is to authorise Dr.Siddhartha to do the initial contacting. Perhaps for checks & balances, Chairman may name two-or-three persons with whom he should coordinate and based on a consensus he could act short of making formal commitments. Without such an authorisation many industrial interfaces are getting bogged down.

Item 3 RCS production, precision machining

Chairman may recall that in his recent meeting with Dr.Muthunayagam, in which Chairman said that various reports have been received from many Centres like ISAC for a RCS facility, on control components from VSSC/PSN, etc. He said that there is a need to puttogether these in a cogent form. He also mentioned it to Dr.Muthunayagam that Chairman would set up a Committee to study these issues. The question naturally arises when the Committee will be set up to study the matters. Instead if some persons, Centre and HQ as the case may be named by Chairman to take a lead in this matter to study various issues, they can sort out various details and come to Chairman with a final version for decision with a few options. Then matters will become much easier for decision making. I don't say that the method is going to be easy. Some persons will fight out issues, but still if some authority is given then some themes can emerge from which Chairman can choose. If things have to wait till Chairman defines the inputs, then it may not start for

(1421)

say next 3 months. Chairman could be careful in naming the persons. This procedure would necessary mean that some persons should be able to write to Director, ISAC and Director VSSC and discuss with them about the overall theme, make joint papers with assumptions of certain guidelines. Everytime to come for all these issues with detailed notes for guidelines from Chairman would cause delay. Hence as far as taking action is concerned, Chairman may nominate some people with some broad guidelines (oral would do). As regards the progess made, a one-page memo can be sent to Chairman periodically.

Item 4 Microwave Remote Sensing

This is an area which needs urgent attention if it has to pick up at all in ISRO . This would mean some correspondence with BEL, with some national agencies/institutions etc, even exploring some time ups with bright individuals for Scatterometer studies, SLAR etc. How does one can go about it? Could Chairman decide to leave these questions to be handled at first level by a few persons from SAC, and HQ so that it can later be escalated to Chairman for decision making? Of course to a certain extent these persons have to be authorised for some commitment at least morally. Again for checks and balances a joint action may need to be asked for by the persons named by Chairman.

Item 5 IRS coordination

So far discussion has been at the Secretary level. Things are going to pick up too fast. Already discussions with GSI has taken place. How does one determine about some of the commitments? Only one thing which Chairman may forbid from commitment could be additional recruitment of manpower and too much of monetary commitments above certain level (say more than Rs 2 lakhs). For other things perhaps some form of delegation to a few persons (jointly) may be authorised to take action.

Item 6 Cooperation with NAL

Dr.Valluri, Director NAL had written to Chairman naming persons. Chairman has seen this letter. I had discussed with Chairman about

(1422)

further action and Chairman wanted a detailed letter to Dr.Valluri describing the systems on which NAL could think of working etc. I am in the process of preparing a draft in consultation with Dr.Siddhartha and Shri Sudarshan. However my feeling is that through this process it is likely that the matter will be further delayed. I do see Chairman's concern that the cooperation should start on a proper footing and is not skewed by certain individual idiosyncracies. On the other side the question of speed on this matter seems to be of some concern because either Dr.Valluri is away sometime or Chairman is busy with some other tasks. Since Director NAL has named Dr.A.K.Singh for the overall coordination from NAL side, may be a few persons from ISRO could be named who could jointly discuss with NAL team for working out details on some matters in this regard. When views have to be formalised for action, a crisp note should come to Chairman for approval.

Item 7 Optics Facility

Chairman has seen the Optics Facility report and their recommendations. Chairman has also seen my note on the subject. Chairman had remarked that it is now time to move towards a group to focus on these activities. He had remarked as under:

"We need the following:

1. A concrete ISRO programme relating to the major optical systems for the coming projects needs definition: If someone can list the projects in which the optics are embedded we can then discuss action.

2. In parallel with (1) certain advance actions can be taken . These can be
   (a) setting up of a standing group on optics,
   (b) Finding & 2 agencies each for the critical areas,
   (c) Feed information into RESPOND,
   (d) Stock-pile some materials."

Now regarding he question of moving this matter if it is to be done at HQ alone would be difficult as we cannot get all data. If Chairman can authorise a team of people to work on this matter in a managerial fashion as against study group mode, then some focussed options decision making could be arrived at.

(1423)

Item 8 Yellahanka site

On the Yellahanka site, while accepting in principle the proposal sent by us for setting up RCS Facility etc Chairman desired detailed plan of action. For this one needs to approach VSSC, and ISAC for working out details. Without some form of formal consultation with them it would be difficult to move on the matter of producing good data base. Action here could be speeded up by naming a few persons for working out the details for submission of a few options to Chairman after due consultations of course with Directors, VSSC/ISAC.

On the above items Chairman is requested to give his decisions/instructions against each item in the left-hand space so that some action could be taken. I would request that Chairman names a few people with instructions as to how to proceed. On each item to issue an Office Order would perhaps be difficult task to do. Since generation of guidelines require very detailed work on all these and to bring it to a level of Office Order for Chairman to issue is really a task in itself. It is with this view, some general instructions or suggestions are requested. It would be expected that the persons Chairman names would jointly work as a team and generate a few options to be placed before Chairman.

I think that many of these planning activities and coordination activities would continue to get bogged down without some sort of above suggested "delegation". It is my considered opinion that even after signing of the contract for INSAT-1, it is unlikely that Chairman would be free from INSAT as at least one problem a week related to INSAT will come to Secretary, DOS. Hence a new mode of functioning might have to be conceived and hence the options suggested above.

(Y.S.Rajan)
13/7/78

Chairman, ISRO

13/7/78

(1424)

~~My job~~

My tasks, I took to myself, was to keep ISRO things going. SD never discouraged it, nor showed any displeasure though he may not always respond to my notes. Thus I was both a gadfly and 'busy-body', but tolerated by him

The fact that he had kept such notes for long years carefully and handed them over ~~careful~~ in a well arranged manner during end Sept ~~19~~ 1984 ~~wt~~ just a couple of days before he laid down office, indicates to

(425)

me that he valued my notes.

While other items were going on from ~~July~~ my earlier ~~a~~ July note 1978 notes, ~~then~~ I found only ~~one~~ two notes around Dec 1978.

As I had indicated before, my regular notes to Chairman, Directors, ISRO HQ colleagues ~~at~~ AS, JS etc ~~were~~ were large in number almost 10 daily (let alone other papers which I see and write comments which may be around 100 per day). Most of them are routine, though important & some may be firefighting type. But two major programmes of the future were being unduly ~~deta~~ delayed.

(1426)

Therefore I had made two consolidated notes (separate) on them and sent to SD.

One was on IRS ~~as~~ was detailed as it had reached a fairly good level of planning actions to move ahead

And one on SLV-~~V~~ variants was just a page as initiatings action itself were lacking.

In IRS note I say "friends, I should point out the complexity of the problem should not be reason for procrastination. We can't wait too long."

*Add

→ See IRS 1427-1431 → attachd

SLV-3 → 1432.

(427)

TO BE OPENED BY
CHAIRMAN ONLY

Prof.S.Dhawan
Chairman, ISRO

Y.S.Rajan 14 December 1978

Some immediate actions concerning IRS.

ZERO BUDGETTING:

1) Even while the zero-budgetting exercise is going on regarding ISRO programmes especially IRS, SLV-V etc, we need to initiate urgent activities regarding IRS if one were to move on the programme at all. Start of the programme cannot afford to have any set-back. If it slips a little, the chances are that the programme will receive serious set back.

2) Zero-budgetting exercise has been initiated today (14/12/78). Sudarsan & Chandra will put a basic scheme in a few days which will be elaborated further, discussed in HQ and then put up to Chairman. This will involve some-time especially coordination within HQ. Then actual interaction with Centres and decisions (by ISRO Council & Chairman) are going to delay considerably. I do not see any serious decisions coming before 6 months and therefore it will not apply to 79-80 budget. But as I promised to Chairman, HQ document will be ready in 3 to 4 weeks.

IRS RELATED ACTIONS REQUIRED:

3) As I mentioned in the beginning, IRS has to start irrespective of these. The following are major action points:-

* Defining of a management structure for IRS

It involves the major elements viz, overall coordination, spacecraft management, data product management and utilisation. The facilities part including ISTRAC is another aspect. (I had sent a fairly detailed write up on the subject which Chairman had seen

...2/-

when he was abroad and it is attached herewith.)

IRS management structure cannot be left loose, just because SAC is vociferous or sensitive.

Without clear management structure for spacecraft management etc including overall coordination, the direction is not likely to emerge. I would like to point out the considerable problem for APPLE due to delay in declaring a structure. (RM Vasagam was pulling one way & so on).

* Reorganisation of the Project structures at the Centres:

Presently the ISAC Centre's divisions and the independence of SAC payloads (& VSSC subsystems) are holding to ransom all Projects SEO, APPLE & SLV-3 etc. This trend has to be reversed. Six chaps in SEO core team and about 20 in APPLE along with the Project Engineers of SEO & APPLE who really report to their respective Division heads (and not to the Project Director except "functionally") cannot be the only ones who worry about the projects while the Division heads, Group Directors/Area Chairman etc give priority elsewhere. This means a clear confrontation in terms of Project vs Divisions and also most importantly shifting some Division/ Section heads between VSSC, SAC & ISAC to break vested interests. A solution has to be found for this. The Centre Directors are not likely to favour giving more direct control by the Project Directors as it is likely erode their own sovereign status.

* Regarding IRS utilisation, an overall system definition has to start right away to conduct

- techno-economic studies to identify optimal combinations of satellite, aircraft imagery and ground truth and conventional data.

- Optimal interpretation visual, computer processing etc need to be identified.

- The existing conventional data collection methods needs to be studied in connection with other agencies like GSI, NGRI, etc

(1429)

to evolve a MULTIDATA RESOURCES MANAGEMENT SYSTEM. Flood forecasting etc can really become a sub-set of these studies programmatically.

- In any remote sensing system related to Agriculture without IMD involvement for conventional data, can an optimal system be evolved for the country. How do we do it?

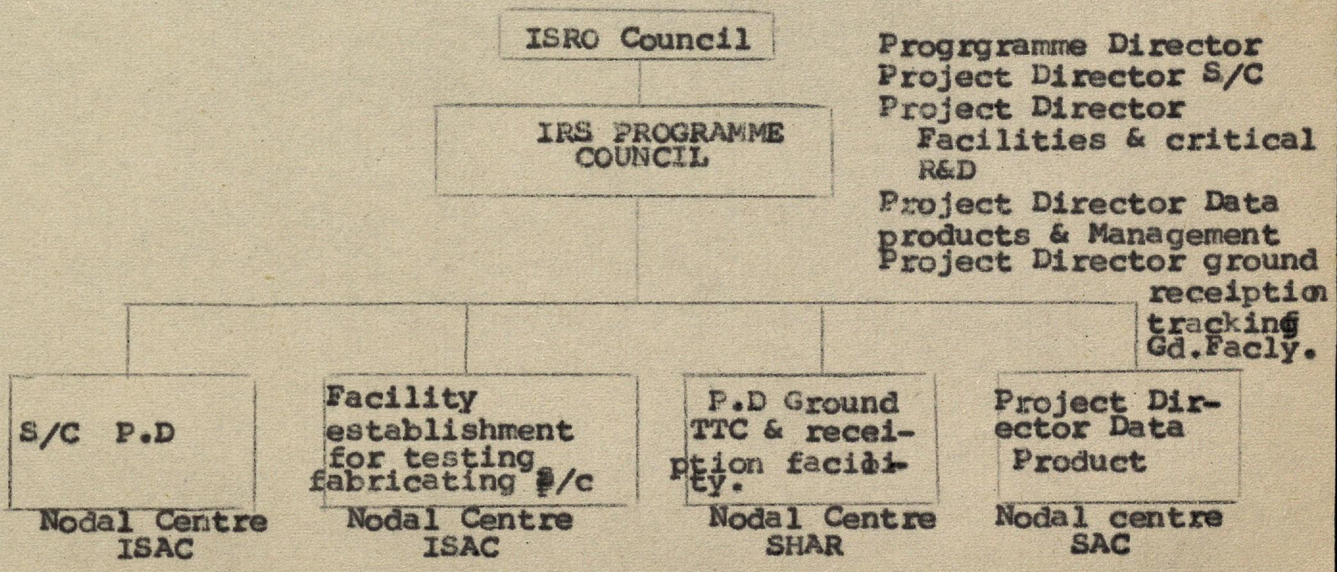
- Also NRSA cannot be ignored altogether.

  SAC does not have the will nor the culture to do this because the existing group pressures will orient SAC only towards utilising & expanding on its existing infrastructure and expertise (all hardware be it Omega Sonde or TV studio will influence SAC) (Their relations with the users are that of a competitor in most cases)

How to do then a system definition? I was trying to interest Prof. R.Narasimha. But he has to devote full time and also begin really in ISRO project mode - i.e., with crazy schedules and intense desire to finish tasks in time. I don't know whether he will move out of his present works and mode of operation.

Another ideal person would be Dr.Kasturi Rangan. I think he can be named the overall Director for IRS programme in which capacity he can also conduct these studies.

The IRS Programme Director should be vested with powers. In fact he should be the Chairman of IRS Programme Council through which only the overall coordination is done.



(1430)

Each nodal Centre can have a Project Board (containing persons from other Centres too as needed as in SEO, APPLE etc) and these Boards are under Directors of the Centres. But overall coordination, inter-se priorities have to come to IRS Programme Council which will be under Chairman, ISRO. IRS Programme Director will thus be on functional par with Directors and will have authority in programme control. Directors may not like it. But I don't see a better form of coordination of this complex and time bound matter. IRS Council Chairman has also the responsibility for system studies mentioned before.

PROBLEMS

Since SEO has not been launched yet, I can very well see that one has to worry about the repurcussions in the Centres and the need for a little caution. But that should not be the reason for continuing the SEO structure where the Centres can operate autonomously and moving (especially SAC) only when Chairman asks for it.

POSSIBLE IMMEDIATE ACTIONS

Without waiting for SEO launch, Chairman may issue the following guidelines:

(a) The Project IRS will be split into four major elements with nodal centres as indicated above. There will be an overall coordination body which will be identified later. The following team is formed so study technical issues:

A few names of persons whom Chairman considers would play important role in IRS should be brought into the team.

No papers from the Centres should be invited on the subject as this will create lots of emotions and especially in SAC energies diverted towards this.

The initial arrangements can be called ad-hoc or interim.

(431)

Within a month after SEO launch, the entire structure should be formalised naming the individuals as Programme Director (Designate), Project Director (Designate) etc.

Two persons in HQ who can assist a take-off of an IRS Management system are Chandra and myself. If Chairman does not clearly indicate to Directors that they cannot work in their old modes, there will be more teething troubles than required. If firm decisions are not given people will attempt dilatory techniques (as was done for SEO) & so on. Directors may be told to operate through ISRO Council. I understand that in such a mode their decision making role will be truncated (as it is their feeling vis-a-vis INSAT where Project is more powerful in powers). Chairman may consult the Directors, therefore, at a personal level - face-to-face talks - without asking for formal papers which lead to percolation of the conflicts to all levels.

In end, I should point out the complexity of the problem should not be reason for procrastination. We can't wait too long.

(YS Rajan)

(1432)

TO BE OPENED BY
CHAIRMAN ONLY

Prof.S.Dhawan
Chairman ISRO

YS Rajan

16 December 1978

Some immediate actions concerning SLV-V ;

I have sent a note on IRS - rather an elaborate one.

SLV-V is relatively less complex as SHAR & VSSC have learnt living together better and there is not so much of desire to have programme control as the desire to execute work.

SLV-V still needs urgently a programme management structure. The elements for separate management are as under:-

1. SLV-V Overall Programme Control (including interstages and integration)
2. Liquid Engine Development
3. Chemical facilities Establishment
4. Booster and upper stages
5. Control guidance and electronics (including Mission operations)
6. Range Establishment
7. Engine/Motor tests

These seven Project Directors/Managers can be overseen by the P.D. for Item 1. Again VSSC will need fairly major reorganisation putting more people from the Groups directly under the Projects.

The main point in SLV-V programme is to identify some key persons for individual elements for which Chairman may speak to Dr.Brahm Prakash, Shri Pant and Shri Kalam.

About a month ago PS had written Director SHAR & Majumdar yesterday he has written again

Also for writing of SPROB & STEX expansion and some other test facilities, Chairman has to give formal go-ahead on paper. No-body is moving on these writing as there is some confusion as to who will bell the cat (2.6 meter etc).

(YS Rajan)

~~Add Pages~~

(1433)

1979

~~As~~ After return from USA/NASA, it was almost 5 years completed in ISRO HR. (1974 – ~~Dec~~ 78). 1979 was knocking at the doors. So many achievements! So much of actions. Also, I should add, that there was a lot of growth for me within ISRO. I was holding many top positions within ISRO.

I went to many countries in the world – especially USA, Europe, USSR – in connection with ISRO tasks. I learnt a lot. I had some very good friends within ISRO. I helped solve many problems within ISRO – not just ~~as~~ at technical levels but also for a number of problems for "small" persons within ISRO. Also I read a lot of books, magazines etc. On the home front, Vijay grew well; Vikram was born. Periamma passed away – a loss; but in a way she lived the way she wanted and died peacefully.

Come 1979 two major launches were before ~~us~~ ISRO. SLV-3 and SEO-1 (later name Bhaskara)

But working in ISRO HQ was getting worse and worse. Looking back, I wonder how I could withstand that strain. The fact that I could do so much might have been the motivation factor. SD's style of working allowed me lots of space; but it had in it a good dose of confusion of roles; he was moving more towards analysis "paralysis by analysis". He was not quick in decision making. A peculiar problem was that if any body raised an issue with him, it became important despite all the earlier work done on that matter by so many persons including himself — too much of "Sri Rama" syndrome as was described by Prof RN (Roddam Narasimha). Maybe it was a spillover from the "academic democracy" from being Director of IISc.

Within HQ & SD's such

(1436)

a mode of working was fully exploited by JPS. SAC also did the same, raising many petty issues to Chairman, ISRO through YP's letter.

~~R~~ ~~I~~ Though I had been raising issues about my problems of working in ISRO HQ, I did not name some persons; even in my direct discussions with SD I did not raise individual person's name.

Another problem was that ISRO HQ was not homogeneous in terms of capable persons. For example persons like Chandra, P Sundarasan were very capable PNJ was very knowledgeable with vast experience. But he did not get into the

(1437)

local politics of ISRO HQ. Probably because of unnecessary inputs by JPS who might have thought the PNJ would be aligning with me, PNJ was not given special position, whereas Dr. S.C. Chakravarty who earlier along with Dutta was brought by PDBL was made ~~#~~ focal point "Space Science" office". Probably not to show much for me! But SCC's knowledge of Space Science as a whole was very poor. Not ~~did the~~ was be able to learn from PRL or NASA documents. Also lazy. But in between (probably pumped by JPS) he would ~~Also~~ shoot of some memo to SD, which ~~will~~ will ~~can~~ be marked to me.

(1438)

But he would ~~not~~ not tell him to send through me.

I wrote a blunt letter to SD on these matters, handwritten ~~6 pa~~ 6 pages. I start off saying I did not want it before SEO, SLV-3 launch but things ~~are~~ were getting very bad and I wanted to get them off my ~~ch~~ chest.

I end with red ink — I request Chairman to tear this letter off, as nothing is safe in this office; and I do not want any crisis. But ~~he~~ SD had kept them safely and returned to me.

See next pages
1439, 1440, 1441, 1442, 1443, 1444.

(14 39)

23/4/79 Page - 1 PERSONAL / CONFIDENTIAL

FOR CHAIRMAN'S USE ONLY

I had been pointing out to Chairman in general terms some of my problems of working at HQ. Recently I requested Chairman that we should discuss the matter frankly in July 79 — after SEO and SLV-3 launches. While I still believe that that is the best time since now Chairman cannot concentrate on anything else but SEO & SLV-3 launches (and INSAT OMC question), there are certain things, which I think, are getting very bad and I sh'd get them off my chest.

This concerns Jai's style of functioning. A high-strung individual he is, his desire for power and being projected as a (or the?) most important person seem almost to be an end for him. Though many times I have been hurt personally and I felt that ISRO's interest are severely hurt (as I see it), I never raised the issue with Chairman — I went along

(P.T.O.

gulping everything in the general interest of ISRO.

Jai has always been an excellent worker and that is one thing that comes on the top of mind to compromise on anything he does and put up a general show of agreement with him — solidarity so to say.... I was aware of the carcasse he leaves around in his process of doing work and the questionable means he adopts... Things, as I see, have crossed bounds and that is the reason I report to Chairman.

Some points which I wish to point out about him are :-

(i) His desire for knowing ~~#~~ everything so as to keep his plans ~~st~~ going is so much that he has practically broken the secrecy of Chairman's office. He almost takes any file or paper forcibly to scan through. He does enter others' office also to do such a scanning. Lower staff, have obviously limitations in saying "No!" That is one reason I adopt the Chairman's use only on things which should normally be just confidential.

(1441)

Page 3

I specially request David on these things so that he handles them between his bag & Chairman.

(ii) Second tactic is to quote Secretary's name everywhere to get the info he wants — in big formal meetings, from the ISRO HQ Scientists etc. "Secretary told me yesterday or today ..." is the standard preamble to poke into matters not really concerning him but where he has "angular" interests. ... Some junior scientists, even Jayaraman have been troubled by Jai on many confidential matters like this and I had to make some phlegmatic solutions without letting down Jai directly before them or losing confidentiality of their working ... He uses such info for intrigues — some specially created.

(iii) Regarding ISRO HQ administration, the nawabi style of working — ie no sharing of general constraints of the system on him and using everything to suit him & leaving problems to somebody else — causes great inconve-

P.T.O.

nience but this is minor compared to other problems.

(IV) His desire to be always in limelight always leads to his own interpretation of what he should handle at HQ — varying interpretations to suit him. For communications totality sh'd be handled by him (even writing to Secretary, comm'n's for SLV-3 links) but INSAT-1 is one and all three applications sh'd be handled by him. When it comes to ESA or IRS launch, even launcher sh'd be handled by him & so on. ~~Since he scans these~~ There was a time where he wanted to handle everything on APPLE because it is ESA matter & got worked up with Sudarsan for writing on a cast-cure oven for SPROB to meet AKM needs! ... These cause pain at individual levels, and not everybody wishes to run to Chairman to sort out the "sovereignty" of their territories. ... So a working solution emanates...

Given the above scenario, his present trend of accusing Sh Pant & Pry Rao of empire building — virtually shouting around to everybody — because they take

P.T.O

Page 5 1443)

Some ~~firm~~ stand on INSAT which is not palatable to him, causes serious concern. In the Board Office orders & procedures are discussed & Secretary, DOS name is thrown around every next minute. May be Jai is afraid that MCF will be integrated into ISTRAC ~~thus~~ & Proj Rao & ISAC may play a greater role in Spacecraft thus diluting his position . . . He has presently started a verbal tirade against Pant & Proj Rao calling ~~also~~ all names — liars, empire builders "I will cut them to size" and so on. (Of this I have direct knowledge; he told me also). I heard from one or two ISRO HQ scientists that he has also started telling them that ~~S~~ I (Rajan) sides with Pant & Proj Rao and am against SAC! . . . Jai was praising the Electronics activities Committee of Sh Pant a few days ago and wanted to draft an order on SCT like the order on S-Band Radar putting everything under Pant till the works are completed, has ~~for~~ past two days shouting around everywhere that these are all empire-building activities by Pant & he will tell Chairman

P.T.O

I do not expect Chairman to accept or think what I have said above to be correct; nor is it my intent. I also do not feel that Chairman should take any immediate action. Jai is a productive person, though extremely high-strung and immediate disturbance may cause problems at work... But on the longrun I feel such a mode of working is injurious to the Organisation and it should be sorted out.

My immediate purpose in writing this note to Chairman is to put forth my views and apprehensions frankly to Chairman, since I feel Jai is in a high excited state presently due to SEO etc and Chairman may not have time to analyse certain things he may say. (He may even say that he has coordinated with me!)... I have confidence about Chairman's functioning with the various inputs, but my silence on this issue should not be seen as agreement and I wished to inform Chairman.

Raja
23/4/79

NOTE: I REQUEST CHAIRMAN TO TEAR UP THIS NOTE AFTER READING AS NO PAPER IS SAFE AND I DO NOT DESIRE ANY UNNECESSARY CRISIS.

Raja

(1445)

When I read the above now @ 2017 I feel bad for me on one side; on the other wonder why SD kept it all. It can present a different picture of functioning of ISRO HQ and his own style.

Then I have a paper partly torn off — I don't know how it happens. ~~I~~ It appears to be my note to the ISRO HQ scientists seeking their ~~opion~~ opinion about how to organise Program offices better.

There is a strong red colour writing by VS (~~I~~ Sid) I ~~ca~~ can recognise his handwriting even now!

(1446)

Very interesting comments

Workable system — ha!

"Blood - letting first. Since not possible, why bother."

"ISRO HQ is already a lame duck. It will be entirely limbless"

"As usual only Chairman ISRO, ~~ISRO~~ who will adjudicate / deal with such details as canteen boys, hiring of casual labour etc"

"Forget ~~#~~ useless exercise

BUT Congrats for the try!"

→ See (1447)

(1447)

1

Yes

2.

No
because
↳ No

3. In y
Direct
present
Should it nece
of Centres to make
is not looking at a
workable system.

Will never occur

ha!

4. Are there any comment
key executives, their

Blood-letting first. Since not possible, why bother.

5. Any comments regarding
these Programme Directo
ISRO should act? or in ot
respective "hierarchial a
is borrowed from VS-from a

Then what is the role of existi
vis-a-vis Programme Directors?

ISRO HQ is already a lame-duck. It will be entirely limbless.

6. What are the mechanisms of coordinat
2 or 3 or 4 Programme Directors that may
from time to time, since there are likely t
conflicting demands?

As usual only Chairman, ISRO who will adjudicate deal with such petty details as canteen boys, hiring of casual laborer etc

7. Any other relevant matters.

--- etc ---

Forget useless exercise
BUT congrats for the this!

(1448)

There were no such notes from me (it appears for about ~~a~~ six months) till 25/10/79.

But there were lots of interesting things (~~we~~ had happened during that period.

First and foremost was the SEO - I launch for which ~~were~~ we went to USSR.

As usual the team would go earlier and SD / me etc would go later. ~~I think that we~~

~~At~~ PM (Morarji Desai) and the ~~a~~ team of Cab. Ministers had come to Kremlin to meet Soviet leaders. SD, URR, myself & KKR came to ~~to~~ brief PM.

~~(1149)~~ (1449)

I don't remember all of them. I distinctly remember Vajpayee — all were sitting comfortably on the nice carpet and working on a desk.

We came to the area where PM was ~~done~~ working with Charkha (a little modernised, compact one).

~~But~~ He was also in sitting posture doing it.

For us ~~the~~ chairs were arranged with a coffee table in front with lots of chocolates. It was odd for us to sit on chairs when PM was sitting on floor.

(1450)

PM very kindly & courteously asked us to sit down and have chocolates first. He spoke in English.

~~" You A~~ He looked at SD and us and said:

PM: " Come, on! Take chocolates first! You are all young!"

PM: " I am coming from Tashkent and therefore missed my daily morning routine of ~~doing~~ spinning Charkha. So I am doing! Don't get disturbed by it. Keep talking!"

SD was shy in such a situation. We took some chocolates as he insisted — Then coffee, tea.

A brief was given about SEO-I and subsequent plans.

Then he asked a question to SD, "Soviet side asked me about our interest in sending an Indian into Space. I was non-committal. What do you think?"

There was a background to the matter which was held "secret" within ISRO. Whether there was a note in PMO or ~~note~~ not. The earlier PM, IG was offered by Brezhnev a human flight by an Indian. USSR had flown one ~~cosmonaut~~ or more cosmonauts from their friendly countries. Since India was very close to USSR especially the Indo-Soviet Treaty

Signed ~~tat~~ before the Bangladesh liberation, ~~the~~ USSR leadership ~~want~~ desired to give India, an opportunity. This would make India much closer to USSR. Though USA had been difficult with India for launching its satellite, it was coming closer for launching INSAT-1 (as it would give business to USA!). ~~Bu~~ So that could have been also taken into consideration by USSR. IG had indicated positively without giving any date. As it would have been during Emergency, ~~was~~ no information would have come out.

IG had SD for his opinion. He told me. He was against ISRO diverting its attention on manned mission. He had lots of developmental tasks to be completed: SLV-3, APPLE, and upgrading them; then INSAT-1. Too much in plate.

IG probably did not like a lukewarm (or negative) response from SD. I think he has ~~given~~ coated it with a number of jargons that ~~it~~ it should not ~~be~~ merely be India giving a cosmonaut but should ~~have some~~ derive some scientific knowledge from it. (That was the stand he took later too!)

(1454)

~~So~~ When IG was defeated in elections, nothing much moved. Therefore Soviets had taken advantage of PM's visit to broach it again.

SD's response was nicely professional. Some thing to the ~~"It~~ effect: "We need to look at it carefully vis-a-vis the advantages we ~~ha~~ derive out of it. We need to see whether we get scientific benefits ~~and~~ what typ?..."

PM could clearly get the message that SD was not jumping at the offer.

~~He~~ PM made an observation: "I was ~~also~~ also wondering what

123

(1955)

we will do with an Indian who goes to Space and come back?"

He also thus indicated that he ~~had not~~ was not very enthusiastic about it....

That more or less finished the briefing of PM and we went away walking through the row of the ministers and officials sitting and working with desks on floor...

*   *   *

I don't recall whether it was with this ~~meet~~ period of the meeting or perhaps earlier, when we had come as delegation to the USSR for SEO-I.

(1456)

As the Soviets were fond of throwing ~~a~~ a reception (mostly for lots of vodka) and dinner, our Ambassador (Gujral?) had arranged the party for the Soviets side of ~~the~~ Project, plus a number of other Soviet officials. ~~It was~~ Probably it was around the time when the Janta Govt had come to power. ~~All liquor~~ Liquor was banned from all Govt functions. ~~The~~ In the earlier occasions and even now Ministers do not take liquor in public and ~~for when they~~ officials take usually after the Ministers go. This is one ~~p~~ moral hypocrisy which continues in India. ~~Mi~~ Most ministers take in private.

(1457)

This is so even now. Moraji Desai being a person of strong convictions banned serving of liquor with or without ministers. The exemption that liquor can be served when there were ~~the~~ foreign guests was always there. He took out that also. So the Ambassador was ~~serving~~ serving, Tulsi Paani, ~~Butt~~ Spice Butter milk ~~etc~~, fruit juice etc. Poor man he was going around explaining individual drinks to the VIP's he had invited. It was terrible for the Soviets who enjoy vodka, whisky and such strong drinks.

~~I h~~ ~~IS~~ In ISRO ~~we~~ at Bangalore, we had such difficult situations, during that period. For all our ~~inter~~ meetings with international partners, we arranged nice dinner with good Indian food and also drinks to serve — beer, wine, Whisky etc not costly ones but reasonable ones. They used to enjoy ~~our~~ our hospitality and that was ~~a peri~~ a time for some informal exchange of ideas; knowing a little about cultures etc. — More to create a close warm relationship later in work.

When French delegation comes or for some specific European guests we used to invite persons like

R. Radhakrishnan, ~~son of CV~~ Director Raman Research Institute (RRI) & son of C. V. Raman (Rad never ~~want~~ wanted to be known that way!)

(1A59)

He had a French wife. It was an added advantage for the foreign guests. Rad enjoys good hard drinks and ~~in the end~~. not so much on food. Then he would say. "I want to have good curd rice — and say in Tamil ஐயர் வயிறு that is Aiyai's stomach!"

~~As~~ There was ~~an int~~ a meeting with CNES persons (French Space Agency). So for the dinner he and his wife were invited. But the big problem of prohibition! So only fruit juice & soft drinks! After a couple of them Rad was so fed up and came to SD. (They were good personal friends).

(1960)

~~He tolde SD~~ " Satish!

He was acting like a drunk man and told SD " Satish! I had too much of fruits juice cock tail... I am drunk now.... ".

What to do?

These were all the funny situations we went through.

~~At~~ ~~S~~

~~A Sr~~ During that period when I had gone to Dehra Dun for having an official work with Survey of India, which had many Army officers as deputationists, we used to have a good dinner and the Army tradition drinks! But this was the civilian sector and the govt rules applied — no drink!

(1961)

That too in a public place — ~~a~~ hotel. The problem was solved in an interesting way: we were all served tea (black tea from the kettle) into our cups. There were small eats as usual. The liquid, looking tea like, which poured was ~~a~~ whiskey diluted with water!

We enjoyed the evening & raising toast to the Govt. regulations & the PM!

× × ×

Irrespective of Janata Govt. (which banned all liquor serving) other Govt. ~~regulations~~ rules also ~~pro~~ denied serving of alcohol ~~to~~ ~~when they~~ for Govt. meetings when there was only Indian persons. It was understandable because Govt. did not want Govt servants spending ~~to~~ away scarce govt money in drinking amongst themselves in the pretext of a meeting. In ISRO we followed it strictly.

But there was a need for exceptions for Press/media. As a matter of policy, something so unique ~~to Govt~~ in Govt system, as per decision of SD we used to take Press persons about 30 ~~50~~ or so to ISRO Centres, where They ~~will~~ would spend a couple of days for a guided tour. We did not do it to get a special coverage. It was a belief of SD (we shared) to keep Indian public informed.

(1963)

Our P & PR (Publicity & Public Relations) officer V. K. Nair used to accompany them. It was a well known fact that no (or most) Press persons can be without ~~a dri~~ drinks in the evening. Then, of course, chicken etc.

The liquor part was served but billed as some high cost non-veg food! So we ~~are~~ were clean on paper. A standard practice by ~~all~~ all govt. depts and even some PSU's.

But there were some difficult situations when the Press visits SAC Ahmedabad. It was a Prohibition State. It will be

(1964)

very difficult to get a drink.
& Most press person understood
& were accomodative; but some
press persons would go mad
and pressurise V. K. Nair who was
helpless. It would be ~~dan~~ risky
to ~~smg~~ smuggle bottles!

Not allowing alcohol
in Govt parties was also prevalent
in USA especially its Central Govt.
(call Federal). NASA persons
could not entertain us with liquor;
they would bring their liquor, that too
not in Govt premises. Or do it
through a Contractor ~~of~~ for Spacecraft
in a hotel!

(1465)

I had ~~che~~ checked from Google about Bhaskara-I launch It was in ... June 1979. So the PM (Morarji Desai) episode narrated before would have been around that period. Almost a month later ~~he~~ he had to step down as PM, due to internal intrigues within the coalition partners.

Activities of ISRO did not have any dent due to such transitions. The approved projects were proceeding well. ~~a~~ Further continuation of SEO I (Bhaskara I) through SEO-II continued with an MOU with ~~U the~~ USSR Acad. of Sciences. Again a free launch and few of the satellite systems were given free of charge by the Soviet side.

(1466)

So was the work on INSAT-1. Our main interface was the Planning Commission for ISRO budget exercise. Then the overall Govt interface went through the Space Commission which had Cab Secy, Princi Secy to PM and Secretary Dept of Eco Affairs of Min of Finance — SD ~~who~~ was the Chair.

Though ISRO did not do anything spectacular ~~to~~ during that period there was a great confidence about ISRO in the Planning Commission, and higher levels of bureaucracy in the Govt. Much of the credit for that should go to SD, who did not get involved at all in the Delhi politics, Science politics etc. All of them could see that he was a man with a mission and did not boast about it. He was concentrating upon doing the job. He was very dignified; not arrogant. He just communicates just enough for the job at hand. Also, he had a charming personality. ~~He~~ Though he had a direct access to PM, he was not throwing around his weight or by passing other depts, its secretaries etc.

Therefore the "violent" or tumultous transitions in the PM and PMO did not affect ISRO.

We will skip many of the regular happenings in ISRO which were intense. I was also active in many of those technical and managerial ~~and~~ works. International cooperation with CNES, ESA, DFVLR also were growing. For DFVLR ~~was~~ I was

(1468)

the coordinator from Indian side, an inheritance from Pf. PDB. ~~[illegible]~~ In the transition was one Dr. Schurer for ~~[illegible]~~ a brief period, then it was Dr. ~~[illegible]~~ Herwig Öttl with whom I had excellent rapport. Probably it will be good to place all of cooperation with DFVLR at one go, cutting across time period and chronology. It had one poignant moment of IG's sad demise when URR (as Chairman ISRO) and we were all there!

As of now we would go back to the papers given back ~~[illegible]~~ by SD to me and dwell upon it. ~~[illegible]~~ They are (SD&I) only a few ~~[illegible]~~ now as we had to be on travel. That does not mean my notes were not there during that

(469)

period. They would be in the regular ISRO notes, ~~or~~ hopefully in ISRO archives.

~~The paper after the April note was in 25-10-1979, As the note starts "Cr titled "Critical action items for Chairman" The note starts:~~

~~"Chairman had asked me for a brief review on some critical activities to be addressed Chairman in the ne~~

* * *

Before doing so One major even between my April 1979 note & the next on 25-10-1979, a major event took place for ISRO That was the launch of ~~SL~~ the first ~~exp~~ experimental flight of SLV-3-E1

(1970)

It took place on 10 Aug 1979.
(Vijay was getting on 9 on 12/Aug
& Vikram was getting into 2 on 18/Aug)
We were there well before. If I recall
SD ~~FB~~ was there 3 or 4 days ahead
of the flight. BP was there. All
the big ~~guns~~ persons of VSSC and
all developmental persons / crucial
technicians. Kalam & SLV-3 team
had moved over many weeks ago.

As was done for Aryabhata,
SD desired me to prepare a
success criteria for the mission.
~~It is~~ The draft was discussed,
cycled & finalised well before the launch.
The fact that we could all
elements together & to get ready
for launch on the launch pad also

(1471)

got some marks as it was the ~~the~~ first-ever launch for ISRO/India. Then ~~st~~ performance of stages etc. There were many parameters. One ~~cann~~ could not just have a "go – no go" decision whether satellite was launched successfully or not. It was an open loop control system for the first launch; it was so for all of the first series of SLV-3. If we had attempted it, it would be one additional complexity for the launch vehicle but also would have reduced the payload weight, which was precarious: already 50 kg was not attainable; it was 40 kg satellite.

Open loop means the satellite may be in any elliptic orbit — no control as we now do with PSLV for various satellites. Thus there was no special mark for circular orbit etc though it was a nominal calculation.

There were a number of reviews. SD did not participate in all. He would occasionally go around the launch pad, look at vehicles ask about the tests etc. A day before I recall his asking the SLV-3 team about the possible leakage in a secondary propulsion unit of a stage. He asked whether a particular test was done. As usual the team told in gusto "Yes sir — everything well!"

(1473)

One cannot go and verify at that late hour and SD left it at that for the good sense of the team. In later for other launches of satellites also he asked some sharp questions and they turned out to be culprits! But he would never say later "I told you so!"

Nowadays the launch sequence is so much automated that the sequence is handled by computer several hours before. The technical people sitting before the consoles just monitor the progress and have to step in only ~~to~~ when serious anomalies occur. Even for deviations, there are bounds and computer ~~[illegible]~~

keeps ~~track~~ and only when they are out of bounds red signal is flashed...

In those days this ~~the~~ sophisticated luxury was not possible. An ordinary PDP-8 or 11 computer was used. To get approval [from Dept of Electronics] for ~~getting~~ importing it was a pain. What a moral hypocrisy of self-reliance by the technocrats who controlled DOE and imports. They did nothing to develop an Indian made computer; but ask hundred questions as why we need to import!

Infact ISRO had invested in ECIL to make a TDC 312 ?

(1475)

computer, which was, of course, a copy of PDP-8 or 11 but using different components and India (ECIL) made it possible. (Electronics Corp. of India, Hyderabad). Its ~~was~~ progress was parallelly monitored by ISRO.

~~It~~ Progress was tardy; hence PDP-8/11 imported. That gave a challenge to ECIL — they somehow ~~&~~ made it work and sent a full set of engineers to SHAR for launch to see that it functions all the time. PDP-8/11 was kept as a stand by! The flight was on TDC-312 if ~~I~~ I recall now. (Check with Chandra or N. Ramani)

~~It~~ While it was a rudimentary mission control computer ~~in those days~~ looked from today, one

~~(176)~~ (1476)

should remember that Apollo lunar landing mission was controlled only by one such machine!

Another major external factor for SD was that Morarji Desai stepped down as PM on 28 July 1979 and new PM Charan Singh had taken over on that day. None were sure about its stability; perhaps not even the new PM! His Principal Secretary (new person) was Krishnaswami ~~Sri~~ Rao Saheb; ~~He did~~ one of the finest IAS officer. We had seen him later when he visited ISRO Centres; his sharp questions ~~could~~ showed how intelligent & knowledgeable he was.

Coming back to the launch

the D-Day came. We ~~well~~ were all excited. As ISRO had been keeping the Press informed normally, there was an arrangement for a small Press meet as well; they were brought by early morning bus from Madras. ~~They~~ ~~we~~ None except authorised ISRO personnel were allowed near launch pad or mission control area.

The vehicle took off beautifully. SD was ~~tot~~ tense. After the first stage separation, we could see the misbehaviour of the second stage; also lots of black smoke!

(1978)

The vehicle went "mad" and we knew its fate — in Bay of Bengal.

~~It~~ We all felt sad.

Now ~~is the~~ was the time for quick action.

A quick get together and a telex was drafted to inform PM (no fax was available in those days for us). Most urgently telex was sent and a call given to PMO to take the telex from SD ~~and~~ to PM.

The press had covered Charan Singh as a 18th century man; ~~no idea~~ having no idea of modern technology or current issues. Our politicians (on the whole, as I had seen all through my life later) ~~of~~

(1179)

have multiple faces; for their own constituencies, image etc they present several forms. In their heart they have some clear corner for items of S&T, and items which will make Indian modern, strong & powerful. That part they show up when they ~~are~~ are in power.

~~A~~ In a few minutes, a nice telex came back from PM Charan Singh (who had been in the seat only about 3 ~~wee~~ weeks) to SD congratulating ~~In~~ ISRO & Indian scientists. Adding that such set backs have be expected and it should not demoralise. He wishes ISRO ~~& its~~ team to be determined to work hard for a success soon.

(1480)

~~Now th~~

Maybe it was drafted by Krishnaswamy Rao Saheb; but it would not be without a clear direction from the PM Charan Singh.

So a major formality was completed. Now SD can ~~giv~~ announce the result to the world ~~(Press)~~ and the Press ~~which w~~ who was eagerly waiting. A Quick filling up of the success criteria showed that the marks were 60% or more (just my memory now!) — that is the reason why SD ~~replied to~~ ~~the~~ stated to the Press "We faltered but not failed!"

(1481)

The earlier drill was to present Kalam the Project Director to the Press and announce joyfully the success. It was not to be. SD went with BP, Kalam, and others in VSSC. He decided to face the Press and announce the set back. ~~He~~ There were ~~barrage~~ barrage of questions as why ~~we~~ ISRO failed? ~~Did~~ Has it found out the problem; ~~who is~~ was ISRO going to enquire into failure & fix responsibility. What is the project cost etc.

SD handled them well. But for the Press which was mostly digital minded even in those days, failure was failure. There were

(P.T.O.)

news flashes that Rs. 15 Crores had gone down the drain in Bay of Bengal etc. Not ~~from~~ for them any analysis of how many initial launches failed in USA, USSR, France, ~~E~~ Japan, China etc. Many Cartoons.

~~The After Pr~~

This is the Press meet Kalam often refers to as the great example of ~~to~~ a Leader who manages the failure. SD was a great person in many ways. — a ~~tru~~ true example of Karma Yogi

After the Press meet, the ISRO teams got together find out the causes: Failure Analysis the term that is used. ISRO had

(1983)

done such exercises earlier too for the intermediate tests that ~~led~~ led to SLV-3. There had been major failures during static test; simulated sounding rocket flights. I had cut down writing on those ~~to~~ partly because my memory is relatively vague on them ~~in terms~~ in terms of details, ~~&~~ and more importantly to reduce the size of this writing. They were much more detail in technology issues. Suffice it to ~~state~~ note here about such failure & mechanisms of failure analysis which had well settled by that time. SD allowed the teams to work without himself disturbing them.

(1984)

For Kalam it was a great disappointment. One could see it in his face. But he did not break down. He was nearing 48 years then. A success in that could have even helped him to become Director VSSC.

Another person who would have been very sad, but did not show up at all was the other Karma Yogi B.P. He was going to lay down office after recovering from his stroke. He would have been happier to lay down with a success. One tall person responsible for bringing SLV-3 E1 to the launch that day was B.P. Without him internecine quarrels, ~~squall~~ squabbles, etc, would have seriously damaged the focus towards SLV-3 project. I am able to see it more clearly in the hindsight. Most of the Indian S&T institutions like CSIR, ICAR etc had transformed (or degenerated) into laboratories with individual or small group "satrapi's". ~~Within~~ The ~~indivi~~ individual CSIR laboratories ~~wh~~ were to focus on a discipline area and do scientific & industrial research to create products ~~for~~ which Indian Industry ~~to~~ would manufacture. Some were Regional Labs to tackle local problems. ~~and~~ Neither took place.

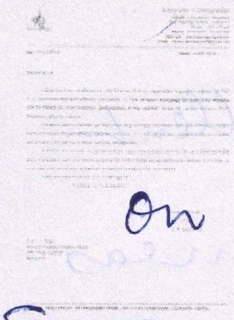
(486)

Each labratory had excellent scientists who worked ~~for~~ in areas of their own individual interests and produced papers. The Nehru Govt and subsequent govts believed that their research work would one day lead to new products which would solve India's problems.

The Green Revolution was not due to the research of CSIR or ICAR. ~~It was a~~ The basis for it was due the seminal work done by Norman Bourlaug and his persistent efforts to ~~att~~ test it

(P.T.O)

(1487)



VIP Requset Letter.jpg
574K

On a large scale in Mexico and ~~Sme~~ some parts of India. He had to wait for a unique individual called CS (he would not have even imagined) to take it on a large scale. CS was the ICAR set up for extension services. The same CS had lots of faith in CSIR, ~~et~~ ICAR etc and created DST for promoting S&T on a large scale in Universities etc through grant-in-aid and otherwise. He ~~did~~ could not unfortunately ~~was~~ continue to look after S&T and its goals except in piloting the seminal document ~~No~~ of National Council of S&T (NCSR). Those reports were

(1988)

a precursor of Vision 2020 document.
But NCST documents were in the dusty ~~schem~~ shelves of Govt and perhaps in some laboratories. It called for end-results with time schedules, some thing which would be ~~trouble some~~ for scientists, their bosses and even bureaucrats of the socio-economic Ministries who controlled the Indian PSU's. NCST reports tied up the Natural Laboratories reports with PSU's products!

Thus most of the S&T work in India were funded resonably well without of course a captain of a ship and rudders to direct them!

(1489)

Even DRDO was so!

Atomic Energy ~~was~~ had a direction broadly ~~so~~ set up by Bhabha; but there were no detailed disaggregation of steps and schedules to be met. That ~~also~~ alone ~~can~~ ~~is~~ could ensure progress, mid-term correction etc to reach the final goal. DAE organisational structure did not make it happen. It was Directors / Group Directors / Heads of Divisions etc. In DAE/BARC ~~has~~ the atomistic or amoebic ~~splitt~~ splitting of individual scientists pursuing their researches did not take place. Section/Division/Group hierarchy took care of that.

That is the system BP introduced into VSSC. Still it could have gone in "Group-frozen" mode. That is where SD's introduction of Project mode – Matrix structure and strong HQ presence in planning and periodic monitoring. The system was not too much hierarchial even though Chairman ISRO was involved in reviews/monitoring etc. BP understood this "new mode" of

~~(1191)~~ (1491)

working. He had the earlier advantage ~~tu~~ of being in DAE/BARC ~~done~~ with Group/Division/etc mode and more importantly in setting of Industries like UCIL, IREL, Midhani etc. These industries had to focus on products. Thus he had the experience of delivering concrete end products ~~in~~ on schedules. Thus he could understand the "projectisation" mode of ISRO under SD.

~~W~~ Thus he was able to "control" and direct the "Group satraps" towards ISRO's end goals; *not

(1992)

in general terms of "excellence in launch vehicle technology" but in terms of delivering for SLV-3, for getting ready SHAR etc. Without that VSSC could have degenerated to like CSIR — excellent propellant scientist, propulsion scientist, aerodynamic researches etc. All doing "excellent" research work and publishing.

On the contrary ISRO did not place ~~high~~ a large emphasis on research publications. It wanted delivery of products towards the well defined / approved "satellite" and launch vehicle projects and the

(1493)

program elements for the same. Even the technology development for future projects ~~were~~ ~~no~~ was ~~not~~ not ~~an indi~~ a decision of individual scientists. They had to be focussed towards specific future projects which were being ~~studied~~ considered by various "study groups" set up formally by ISRO, through a good consultative process.

BP-SD were the DUO who made this focus, ~~pro~~ a practical reality unlike the usual ~~trend~~ of national labs / IIT's / IISc etc.

They were together for a sufficiently long time. ~~BP stori~~ BP / SD

(~~1994~~) (1994)

Started in 1972; BP had stepped out in 1979; SD continued till 1984. Those ~~seven~~ seven crucial years had ~~to~~ made the organisational system to absorb "delivery of projects" as its "culture".

Thus the jealousies, competition, internecine quarrels etc were made subservient to the projects/programmes. Those negative elements did not disappear; but they could not dominate.

Therefore the transition from BP to ~~[illegible]~~ Vasant Gowariker as Director VSSC ~~[illegible]~~ did

(P.T.O)

(1495)

[Quoted text hidden]

not disturb the mode of working of ISRO. Already BP's gigantic role of being Director ~~of~~ of all elements of launch vehicle, range (SHAR) and satellite projects ~~(Ar~~ (ISSP was under ~~...~~ VSSC, under BP though enjoying some benefits of ~~...~~ proximity to SD in Bangalore), had been gradually divested: SHAR had a full time Director free from VSSC or ~~BP's~~ BP chaired Board; ISSP became ISAC with independent Director. Thus the major big role of Director VSSC could easily go to Vasant Gowariker. Also BP's bodily illness and absence from VSSC, had, in a way, prepared

(196)

VSSC to have a transition. Though there were some groups (and vocal by some groups in ISRO HQ like P. Sudarsan) who wanted Kalam to be Director, ~~if that was~~ even a thought of it was sealed with the failure or set back to SLV-E1. Even otherwise Kalam was too junior ~~to~~ hierarchially in ~~the~~ VSSC. The table displayed a few pages ago as my notes to SD & S.K. Warrier note, he was way down. So Vasant Gowariker naturally fitted by seniority & merit (He had done all his tasks of in propellents from R&D in lab-scale to production in SPROB).

(1497)

Not that there were no opponents or grumblers against ~~&~~ VRG. But VRG took control of the situation very well. He knew VSSC & its personnel very well. He had a unique style of functioning: involving everybody, still having his ideas pushed through; ~~He has~~ He also had his own 'tribal' leaders (as we had explained earlier about different ~~et~~ tribes). Some tribes had difficulties; some regrouped, waiting for their turn! Kalam did not have much trouble in adjusting to the new dispensation. He was fortunate to have had a system in ~~fa~~ favour SLV-3 progress in place (procedures within VSSC well established by BP). He had access to SD & DOS.

(1998)

In addition for VRC, making SLV-3 launch a success in its second attempt (having failed in the first) was a real challenge. His style was to ask all the SLV-3 related groups: "What do you want to make the second successful launch within 10 months?" Tell what you want. I will give. But I am going to hold you on delivery ~~on the~~ to meet the schedule!" The message was: we will shame you! Later he had told me once: "When I give promise and ask for the date of delivery to SLV-3 as desired by the project, you will be surprised by what they ask! Some ask for a jeep available all the time plus a couple of technicians; some a particular

machine; some used to ~~ask~~ name
a particular technician by name.
~~An~~ Animal used to be in high
demand; like that some technician!'
... "I really wondered whether
such small items were the
~~real~~ bottlenecks!" ... Anyway
I was to arrange for each of them!
... then often remind them of
their promise! ..."

May be it is human
psychology to gripe about something:
"I am not having this; I am
being deprived of this" etc. May be
it is because of competition, when
one feels, others are getting better.
So VRG's method was to make
them demand and deal with it!

(~~12~~500)

In the later years when I was in DST working for him, he ~~did~~ adopted some what similar techniques in enthusing DST Secretariat persons — staff, scientists etc. He is still remembered by many persons fondly in DST, a difficult organisation because unlike ISRO, there are no fixed goals; plethora of schemes; the scientific groups "judged" by how much you are able to distribute grants etc.
Also with occasional foreign trips..
The administrative staff came ~~of~~ on deputation from several different services (Central / State) with different career trajectories. Many were ~~deput~~ having short deputation periods waiting for a promotion etc. In addition Delhi's ~~"bads"~~ "baadsaahi"

Culture led to a general lethargy in office and a superiority ~~cult~~ attitude against whom you are supposed to serve.

To bring change in methods of working in such persons in a short period of about 4 years ~~is~~ was one of the successes of working ~~b~~ of VRG methods. More on it in the 1980-90 ~~per~~ period notes.

* * *

Though work related to INSAT-1 & APPLE-1 (new items for ISRO, other than SEO-2) were going on, in terms of VAS's ~~pro~~ ISRO Profile 1970-80, ~~S~~uccess of SLV-3 was a great challenge. SITE, STEP, Aryabhata, SEO-1 (Bhaskara) have shown India's capability

(1302)

in satellite making and applications. Also availability of Landsat (ERTS 2 NASA satellite) data have shown India's capability in Application. INSAT-1 purchase was on way. So SLV-3 was challenge especially after a set back in first attempt

* *

But ISRO ~~one~~ cannot ~~to~~ get struck on one project alone. Other items needed attention. SD had asked me to give a brief note on critical items of ISRO at his level. Accordingly I had written a note dt 25/10/1979 "Critical Items for Chairman" (For Chairman's use only). It starts "Chairman

(1~~3~~503)

had asked me for a brief review on some critical activities to be addressed by Chairman in next two months.. I consulted some colleagues at HQ and the following appear to be the important ones which Chairman has to address".

~~For~~ It lists some 30 items : HP = High Priority & VHP = Very High Priority.

It covers a wide range of items : including Personnel, Space Physics Division etc — many pending for long. This note shows that SD still had confidence in me to advise him despite my strong note earlier.

The note is attached.

→ 1204, — 12011

(Continue with that)

(1804)

For Chairman's use only

CONFIDENTIAL
88/7

Chairman, ISRO

YS Rajan 25.10.1979

Critical action items for Chairman

Chairman had asked for a brief review on some critical activities to be addressed by Chairman in the next two months. I consulted some colleagues at HQ and the following appear to be the important ones which Chairman has to address. Also the priority ratings are marked as VHP (Very High Priority), HP (High Priority), and MP (Medium Priority). The items are categorised as Satellite Projects/Technology, Launchers/Technology, Remote Sensing/Meteorology, etc.

SATELLITE PROJECTS / TECHNOLOGY

1. Review of APPLE integration:

H.P. 15 Nov

This should take place somewhere around 15 Nov to take stock of the progress. There are quite a few problems and slippages. However, we have to clearly know as to what will happen to the project as it is proceeding now.

2. SEO-II:

H.P. 15 Nov

While the final views on SEO-II seem to have been frozen, it is necessary immediately to send a note to PM etc and to organise the project formally. This should take place by 15 Nov. Most importantly Chairman has to decide about the Project Director, and whether there should be a Deputy Project Director too. Also some issues like the responsibility for data processing, should be decided by Chairman to issue top management orders.

Over

3. SEO-II Project Report to the Soviets:

H.P. 15 Nov

When the Indo-Soviet meeting on SEO-II and IRS takes place, the Indian position for this meeting should be clear by 15 Nov. Though letters have gone regarding IRS to the Soviets, on SEO-II we are yet to inform them the details, since the Project report is being formulated now. We have to send the report on SEO-II to the Soviets by end-October so that they will have about three weeks to study. Prof UR Rao has been reminded on this already.

V.H.P. end-Oct — Regarding IRS the Indian position and some form of commitment to the Soviets would be essential to fix the launch which will at least freeze one element in the project; such a freezing is very important in view of the long term interest of moving the project through at the various governmental levels. Also in view of this Chairman may decide about his visit to Soviet Union which I think would be essential not so much in view of SEO-II, but because of IRS. This would be in end-Nov.

4. IRS Core Team:

While the formal project approval of IRS could await government decisions, it is considered absolutely necessary to start R&D efforts on critical items related to spacecraft, payload, ground system, etc. Chairman may recall his constituting a 3-man committee consisting of George, Alex and Chandra, to report on sensor development. While doing this they have identified a few critical items. Salient among them are the decision on managerial mechanism of conducting the design studies and development phase related to IRS; initiating work on MSS scan mechanism; move Indian Institute of Astrophysics to design the telescope for IRS; to move CSIO for certain components etc.m Most importantly, regarding this matter it will be necessary to form a team which can effectively utilise George and Alex without necessarily putting brakes on them nor any inter-centre problems. If necessary the Optics group could be made independent of Centres in some form. If this is not done, work on this may not move much. Perhaps a more elegant suggestion would be to move George and his team to Bangalore, and give him some independent status, so that the expertise of ISAC team and other talents could be utilised by this team. The deadline for this, in our opinion, is 15 Nov, i.e. before finalisation of our budget.

H.P. 15 Nov

As regards the other aspects of IRS, critical items are control system formulation, the spacecraft buss design and also some planning and development related to mission. If these are not done in advance with adequate design and development, it is likely that we will go hay-wire when the project is actually approved and initiated. We feel that right now a Project Director, Phase-O, should be named who could initiate design and development on some of these hardware elements and also some items related to utilisation. On the whole, these pre-planning activities before actual project formulation is not expected to exceed Rs 40 lakhs. Thus it will be

H.P. 15 Nov

....more

(1306)

fully in order that these are funded as R&D elements under ISRO/DOS budget even before the actual project formulation, as these can be anyway justified as a continuing R&D of ISRO. But managerially it is necessary for us to have a coordinated and fully directed activity which means Project Director with a small team and with financial control powers. I see no better person than Rangan to run this effort. Other two persons who must be there in the team are George and Alex.

5. Planning for Rohini Mission:

M.P.
15 Dec

We have briefed Chairman about the reports of Tarsem Singh. I think it is necessary to give the profile of ISRO launches to Tarsem Singh and his team asking him to do some detail interaction with a few potential mission scientists to design details of the spacecraft. This will be necessary to make some advance planning, especially for scientific and other application payloads. Towards this it will be better to name Tarsem Singh formally as the Study Director and give him some core team and powers to execute the task. He could periodically report to Chairman, ISRO or ISRO Council for decisions.

6. Decision on Optics Facilities:

It is related to the above IRS work. It is best located at Bangalore.

7. Solar Cell:

H.P.
end-Nov

No reply yet from BEL to Chairman's letters. May be it is necessary for Chairman to 'pressurise' Shri CR Subramaniam to take a decision before the latter leaves.

LAUNCHERS / TECHNOLOGY

8. Fixing of date for SLV-E2 launch:

H.P.
end-Nov

Presently Kalam projects it as February-March 1980. The realism of it should be reviewed by Chairman so that some note to Commission etc can go.

....more

(1307)

9. **Decision on Liquid Programme Management:**

H.P. 15 Nov

Though in some form various liquid activities are being funded as continuing Viking activities, due to lack of decision on formal PSLV project things are somewhat dithering. More importantly the team is showing some cracks which is not healthy for ISRO. Dr AEM has spoken at great length to Chairman about some of the organisational arrangements he desires. It is necessary that Chairman decides on this matter and issue at least some major instructions so that the team will be welded together and hang on to move towards the job. If some instructions from Chairman are not issued before 15 November, things may start cracking up.

10. **Test site selection for Liquid Project:**

H.P. end-Dec

This is another important item and high priority should be attached. If possible Chairman should take a decision at the earliest. But may be this would involve a political clearance. In any case my feeling is that the Commission should take a decision before the term of the present Commission, namely end-Dec 1979. Probably political decision could wait for new government if necessary. If decision at the Commission level is done at least things will start moving.

11. **Purchase of major items for STEX and SPROB:**

M.P.

These are Vibration table and vertical mixer. Chairman has spoken to MF and I do not what the result would be.

12. **Polar Launch Station:**

H.P. 15 Nov

Link up with DRDO? The exact decision by Chairman after the recent visit is not clear. Whatever it is, if a decision is taken resultant follow up actions need to be done. If there is going to be a link with DRDO then I think action on us will start somewhere by mid-Nov or end-Nov.

13. **Organisation of VSSC mechanical facilities:**

H.P. Jan '80

This should be considered for effecting it, say by Jan-Feb 1980, before the next financial year. I have sent a separate note to Chairman on this.

....more

14. **PSLV Core Team:**

V.H.P.
15 Nov

Just as in the case of IRS, we feel that it is imperative to organise the study team to work on critical design and development work on PSLV. Again it is possible to contain the expenditure in terms of R&D within a crore. This team will at least keep the main thrust going and also avoid the Centres going hay-wire and fritter away their energies. Also Kalam should not distort the launch vehicle group without adequate care, having only SLV project personnel alone in mind. This could be by 15 Nov before budget formulation. Also it is best done before Dr BP leaves.

15. **Review of S-Band Radar status:**

H.P.
15 Dec

~~Review:~~ This is again an IMD commitment about which we will have to see the progress.

16. **Organisation of RCS for satellites & launch vehicles:**

H.P.
Jan '80

On this Setty will be submitting a report. A decision around Jan would be ideal since SLV commitments would be mostly over and the teams could be organised before the next financial year to fit into right mode for moving matters.

REMOTE SENSING / METEOROLOGY

17. **Omega Upsonde Status Review:**

H.P.
15 Dec

This is very critical in terms of saving our face with IMD. Chairman knowsthe situation. A review will show the criticality on the matter. No clarity is expected from the review committee set up by Director, SAC.

18. **Organisation of Microwave Remote Sensing Team:**

H.P.
end-Dec

I have sent a separate note on the subject to Chairman. This is very important. This in a sense covers other aspects of remote sensing activities also.

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ORGANISATION / MANAGEMENT / PERSONNEL

19. **ISTRAC organisation:**

H.P. end-Dec — Bringing of earth stations under ISTRAC. If a decision can be taken before the next financial year and perhaps really by December, things can move without affecting the ongoing projects though transitional pulse will be sharp. This would help integrating the activities. However, important issues are involved.

20. **Formulating an overall Electronics Committee and Mechanical Fabrication Committee:**

M.P. Feb '79 — As in the case of PCPB, this should be done. While this can wait for some time - say till Jan or Feb - for a decision, it will be better to discuss it quite soon, since such formulation of overview committees could help IRS and PSLV teams in getting an overall ISRO coordination.

21. **Treating Chemical Facilities as a Sub-Centre:**

This was thought of by Chairman, especially in view of the impending change in VSSC Directorship.

22. V.H.P. end-Oct — VSSC Directorship and also definition of roles of certain key individuals.

23. **Absorption of Shri Setty at HQ:**

H.P. I week of Nov — I feel at this stage his temporary extensions (while he remains a member of VSSC) could be reviewed by Chairman and perhaps he could transfer him to ISRO HQ to work on an overview of Mechanical facilities and launcher related facilities. This should be done sometime around early Nov since his extension term expires on 15 Nov.

24. **Decisions on the task of Chandran:**

H.P. 15 Nov — Chairman had decided that he would be at HQ. Some of his activities could be broadly identified.

....more

(1210)
7

25. **Avionics Review:**

M.P.
Jan '80

What are the managerial actions to be taken to strengthen avionics activities in VSSC? Dec-Jan; before new projects pick up, would be a good time.

26. **Strengthening of VSSC, PPEG:**

V.H.P
I week of Nov

Immediate. Before things slip, and before Dr BP leaves.

27. **Movement of key personnel within ISRO:**

H.P.
Jan '80

In my opinion this is very critical and will have an impact on various actions of ISRO.

28. **Review of SPD:**

Chairman has already spoken to Prof Radhakrishnan. He can now set up a review team urgently.

OTHERS

29. **An overall note to PM on Space Programme:**

V.H.P
Soon

Chairman desired sending this. A draft would be available in a fortnight.

30. **Regarding moving of IRS programme and PSLV:**

V.H.P
15 Nov

Space Commission has desired coordination with national agencies. Regarding PSLV some action has been taken though it is necessary to formalise it urgently. Regarding IRS, Chairman has spoken to Dr Swaminathan on this and it is necessary to formalise this urgently before people change and things drift away. Also we feel that without a linkage with DST to move IRS would be a problem, since the Planning Commission would always raise a question of coordination with NRSA. Therefore it is necessary to establish some form of NRSA-ISRO link. This is best done at Secretary-level with others supporting them whenever necessary. In view of considerable meetings that have taken place with Prof Menon it is necessary to move this formally so that a link can be established. I may also point out here that even if major ISRO-DFVLR coordination in remote sensing may come up, ~~to~~ DOS-DST link can take place.

Regards.

daK

Many of these would have been carried forward. The notes in regular ISRO files would indicate actions taken. Except on Personnel movement & SPD other items moved.

Following that note, I seem to have ~~not~~ bogged down only in follow ~~those~~ items and others routine items. My mind ~~had~~ always been on medium and long term future of ISRO. ~~That~~ Therefore, I was concerned about military applications which would also add to the quantity of

(1512)

demand of space products and
services. I was envisaging the
need and was also interested in
moving fast towards commercialisation
which also be a driver for
Indian Space. Such an idea
was injected ~~to~~ into me by SD
who was telling ~~many~~ several persons in
ISRO about the French Model: as to
how ~~the~~ CNES ~~creates~~ helped to
create SEP (~~Societies~~ ~~Electric~~
Pr. (the company which did
liquid engine & worked with ISRO
for Vikas), Ariane etc.
He used to say CNES played the

8

(~~12~~ 13)

role of Chief Architecht and the companies did the development & ~~prod~~ production. It was so in USA also with NASA, DOD playing the stimulating role and private sector industry doing the job.

So my note of 8 Nov 1979 was to reinforce this ~~thought~~ idea on which I had given considerable thought

Title: "Future of Indian Space Programme and some commercial / industrial orientation for it.

→ (~~1214 – 1216~~)

~~[illegible]~~ 15/4

INDIAN SPACE RESEARCH ORGANISATION

(1514) HEADQUARTERS

MEMORANDUM

/CONFIDENTIAL/

FOR CHAIRMAN'S USE ONLY

For : Chairman, ISRO

File / Ref :

From : YS Rajan

Date : 8 Nov. 1979

Subject : Future of the Indian Space Programme and some commercial/ industrial orientation for it.

The direction of the Indian Space Programme has been worrying me for some time. I had sent various notes on the subject to Chairman earlier. About a couple of years ago I had sent a comprehensive note describing a general scenario wherein possible civilian and military requirements of the country for the next 15 years or so were woven in some thematic form. If one were to think purely in a technological (or a technocratic) sense of the development of the Indian society(i.e. enmeshing of civilian & military needs) will indeed be the direction in which it will move. While we all should wish and strive that much of utilisation of space should be maximally for communication, remote sensing, navigation and other such peaceful applications, it is impossible to rule out defence involvement as long as nations exist in the world. So the brunt of my earlier note referred to above was that we should recognise this reality and work in advance so that internal strength was generated in a planned manner.

Unfortunately on many fronts, due to variety of historical, socio-political and administrative reasons we are not moving the way we should. Even if we were to de-couple the military question, for a while, from the long-term aspects of the space programme without an aggressive and firm commitment at the political, social and administrative levels for space programmes and high technology areas represented by space, it is impossible to sustain a proper development of the technology and therefore its applications. This is the key issue which worries me the most, since at policy making level and also at administrative-executive levels we, on the whole, appear to be overly muddled. Though a few profiles have been drawn about the space programme, it appears to me that the faith in executing such a profile at the higher levels of management does not seem to exist. Though nobody would admit openly I see an under-current of cynicism in most of the actions done in ISRO/DOS especially on the programmes. This is probably because the general socio-political scene seems muddled and the future of science and technology seems to be in much more confusion (especially because S&T had never been geared by the political force towards national development).

...2/-

One way to react to the situation is to just stay loose and allow things to drift hoping that at some day people will realise the importance of Space and gear the programmes. This approach perhaps might have been alright when human beings are not involved in the development of technology. The 'Start-Stop' approach might look nice on paper, but defacto the persons who are in the process of creating a change in the technological scene would themselves get older and perhaps lose faith after a series of "Drift-Push, "Start-Stop" commands with vague guidelines and goals.

How to keep these small technology islands alive, is one question which constantly bothers me. One way could be an ostrich like attitude saying that there is no problem and push ahead with a hope (or deception!) that we have big programmes and we have big future. May be it is so but the current mode does not seem to indicate it. It appears to me that for another 4-5 years the situation may continue to be uncertain. I have been exercising my mind to see how best these islands of technological confidence could be maintained in the country. Again, to repeat, I am a firm believer that high technology activities especially in areas like Space, Electronics and Nuclear fields are a must for any society, more so for the developing ones and especially to a country of the size that of India. Whatever be the moral postures of individual leaders or nations, the harsh reality of development and resultant geopolitical tensions will continue for a few more decades if not centuries, and it is imperative for a developing country like India to have internal strength by developing these technologies and trying to utilise them.

It is with this in view I feel that it is time we develop a channel of commercial/industrial attitude through which at least some of the technological sub-systems developed for space activities by ISRO/DOS and associated agencies should channel their products (software and hardware) into world technological scene. This means that besides giving stress on major ISRO projects like IRS, PSLV etc we should be ready to give equal stress on building a few sub-systems or boxes and even offer consultancy services for delivering (commercially) to international space programmes. Such delivery of subsystems etc should be given an equal priority and not considered as diversion of efforts. Such an approach would almost be like that of Italy, France or for that matter, German Democratic Republic (which makes the camera system and delivers it to USSR). Perhaps this would mean our acceptance of a possible "second-level" position in space judged in terms of concrete programmes but this would also mean that some islands of confidence could exist within India without a single point collapse; for

..3/-

example if some ISRO-delivered sub-systems get into an Intelsat satellite or some ISRO/Indian made ground system is used by another country, then at least those Indian/ISRO groups which have delivered such products to working space systems elsewhere in the world will develop enough confidence in themselves thus keeping their morale alive for some more time when one can hope that the country really wakes up and asks the space engineers/scientists to shoulder the tasks for the country. If one were to use tactical terminology this would mean dispersion of talents to avoid a single point collapse.

Can this be done? My feeling is 'YES' if we give a high management priority to a few areas . Such areas of strength can definitely be identified for design, consultancy and in some areas for hardware delivery to Europe, USSR and USA and perhaps even to some developing countries. If a decision on such an approach were taken now, then within about 2-3 years of concentrated effort by a few talented individuals, ISRO/India would be able to deliver goods in those selected areas. The main aim is not just the profit by providing a few sub-systems and services, but more importantly for the development and sustenance of technological discipline and to keep the islands of expertise alive till such time our own programmes demand these with definitive goals and guidelines. If in this process Indian private industries would be helpful I think we should not hesitate in pulling them in. For example some reputed Indian industries can take up the role of marketing the products resulting from such efforts and perhaps even manufacture some of the hardware or organise a joint consultancy service. I think it can be done and we should try.

My ideas above could also be interpreted as a counsel of despair or pessimism. However I feel in the present juncture of uncertainty (which I think will continue for a while for variety of reasons including our own inability to manage big projects), it will be necessary for us to open a new channel which will keep the nucleus of Indian space technology alive.

Chairman may consider actions on this matter.

Regards

YS Rajan

8/11/79

YSR:ta

(1~~8~~17)

Then follows a handwritten note dt 12/11/79

"Some major items for possible discussions with Secy to PM."

Though the political situation of the Charan Singh Govt was dainty SD did not let go ISRO items, waiting for better times!

Also he had an excellent rapport with Krishnaswami Rao Saheb. SD had initialed it 6/2/80 ?should be & returns — marked to me.

Very important note

→ 1~~6~~18, 1~~5~~19.

Sub : Some major items for possible discussions with Secy to PM

As desired by Chairman the following items are listed as an aide de memoire :

(1) Note on Bhaskara - II : PM's approval to proceed. Schedule critical (Note already sent)

(2) Note on IRS : Note already sent. Importance of launch service. I understand from Dr. Rangan that Soviets will finalise IRS launch agreement only during Jan - Feb 1980. Anyway PM's approval is good to have.

(3) Note (Top secret) on Space Programme & National Security : More an informative note (Not yet sent). Chairman desired to brief Secy to PM & then send it.

(4) Note on overall IRS, SLV-V & Proto - INSAT. A condensed version of the Programme paper already considered by the Space Commission. Yet to be sent to PM. This could be a prelude to sending notes to the Cabinet on ISAC building [and possibly (??) overall programme : at least to start some efforts.]

(5) Land for DOS/ISRO HQ Building : Secy to PM may talk to Chief Secy, Karnataka.

[P.T. O]

(6) The question of employees, CISF, etc Chairman had said that Secy to PM was ready to coordinate this all S&T Scince Depts. Any formal ~~mov~~ move?

(7) Need in 80-81 budget to include substantial investment for IRS & SLV-V. Space Commission needs to stress it so that the Planning Commission does not make a token provision.

(8) Liquid Test Site Selection: Any issue? (Chairman may decide).

Rajan
12/1/79

~~(1218)~~ (1520)

Then I attach a copy of a note by S. Chandrasekhar dt 13/11/79 "An overview of activities for the period 1976-1979. SD would have asked me to give it as Chandra's review was approaching.

I am attaching here because it will give a texture of some detailed work done by the scientists. Others may not ~~[illegible]~~ have such a rich-width. But still, it is a good sample

~~1219~~, 1220, 1221, 1222, 1223
1521. 22 23 24 25

15217

13/4/79
by SCS
(Chairman)
signed

AN OVERVIEW OF ACTIVITIES FOR THE PERIOD 1976-79

The main areas of involvement are:

- Remote sensing and remote sensing satellites.
- Matters related to DOS participation on behalf of the Government of India at the United Nations (UN Committee on the Peaceful Uses of Outer Space).
- Matters related to Disarmament, Space and the setting up of an International Satellite Monitoring Agency.
- Solar Cells.
- Analysis related to INSAT contract negotiations (jointly with Dr Ramani of ISAC).
- Other miscellaneous activities.

Some details of the work carried out are provided in the following paragraphs.

Remote Sensing & Remote Sensing satellites related work

- Budget and programme analysis of the remote sensing activities of ISRO.
- Generation of a short term, medium range plan for remote sensing activities (two such programme profiles have been generated jointly with Shri YS Rajan). These profiles outline a cohesive integrated programme in remote sensing oriented around Indian and International remote sensing satellite.
- Periodically brief Scientific Secretary/Chairman-ISRO on progress and problems related to remote sensing activities (including software development, results and problems in aerial surveys, SEO utilisation experiments, status of sensor development etc).
- Closely involved in the SEO project from its inception. Initially work was confined to SEO utilisation aspects, but was gradually extended to include the satellite also. From 1978 functioned as a member of the Management Board. Primary function was to act as a liaison between Project/Centres and Chairman-ISRO, and to keep Chairman periodically informed about the progress of the project.
- Participated as a Member-Secretary of a Working Group set up by Chairman-ISRO to carry out a technical appreciation of building and launching an earth resources satellite by 1983-84. This was the first study on the IRS satellite system.

....more

(15-22)

- With Shri YS Rajan, contributed a number of papers for consideration by this Study Group. Provided necessary assistance to Dr Hariharan, the Convenor, in compiling and bringing out the report.

- Participated in the Working Group set up by Chairman-ISRO on Sidelooking Airborne Radar development and provided assistance to this Group in submitting its technical report to Chairman-ISRO.

- Guided a trainee from the Indian Institute of Management in a project entitled "A remote sensing based information system for Agricultural Yield Prediction in Karnataka - an Approach". This study is one of the first of its kind in India and it integrates satellite data, sample aircraft data and ground truth into a total system package. The study used a number of inputs generated earlier in connection with ARISE, aerial surveys etc.

- Was responsible, along with Shri YS Rajan, for initiating discussions through Chairman-ISRO with a number of user ministries in connection with the pre-project activities related to IRS. The work included organisation of presentations, coordination with Centres to ensure adequate preparation and cohesion of ideas and providing briefs to Chairman-ISRO for these presentations. The ministries include the Ministry of Agriculture, the Department of Mines, the Ministry of Petroleum, the Ministry of Energy and the Department of Science & Technology.

- Was also involved in the follow up actions required after the presentations including definition of experiments and supply of necessary reports/documents. The main responsibility here was to keep Chairman-ISRO, and Scientific Secretary-ISRO, informed of the status of these activities and if necessary initiate action through Chairman, ISRO for resolving any specific issues and problems.

- Was involved in a three-man Committee set up by Chairman-ISRO for a technical appreciation and development plan for MSS and LISS payloads for IRS. The work included identification of technical problems and constraints, working out a reasonable schedule, advance actions to be taken, facilities to be set up, as well as places within and outside ISRO where the tasks can be carried out. The recommendations have been submitted to Chairman-ISRO.

- Have also been involved in discussions on collaboration in remote sensing between ISRO and other international space agencies. A specific document jointly produced with Shri YS Rajan highlighting cooperation between ISRO and ESA was prepared and discussed during the last ISRO-ESA joint commission meetings.

....more

- Attended a UN-IAF sponsored workshop on remote sensing in Anaheim Los Angeles during 1976.

UN-related matters

The DOS represents India in the UN Committee on the Peaceful Uses of Outer Space. Matters discussed here pertain to technical, legal, and political aspects of the use of space. The primary task carried out here is to assist ISRO Council, Chairman-ISRO, and Director-SAC (who represents India at this Committee) in arriving at Indian positions on matters dealt with by this Committee. The work involves:

- a technical understanding of the nature of space systems;
- political aspects vis-a-vis Indian interests and the overall aspects of Indian foreign policy;
- Legal aspects.

A critical analysis of India signing and ratifying the four internationally accepted treaties on Outer Space, and an analysis on the recently concluded moon treaty have all been carried out as part of the tasks. Follow up of the treaty formulations on remote sensing, direct TV broadcasting are also part of the routine activities related to this work.

In addition, necessary assistance has been provided to the leader of the Indian delegation in the preparation of formal reports, position papers for the MEA, the Space Commission and other agencies of Government as required. As a member of the Indian delegation to the Committee on the Peaceful Uses of Outer Space participated in the deliberations of the Committee in 1978.

International Satellite Monitoring Agency

As part of the general issues related to Disarmament, a Working Group of Experts has been appointed by UN to look into the possibilities of using satellite systems for ensuring compliance with international treaties, disarmament measures and for providing reliable authentic information in cases of conflict.

Have provided assistance to the Indian expert on the technical, political and financial issues involved in the setting up of such an agency as well as advice with respect to Indian positions in other forums (Outer Space Committee). The report of the working group of experts has recently been released.

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(524)

Solar Cells

The main activities involved here are:

- Provide periodic reports to Chairman-ISRO on the development status of solar cells at SPL (based on available results).
- Assist the Committee set up by Chairman-ISRO in identifying an agency for the production of solar cells. The work here involved analysis of the opinions and questionnaires filled in by the members of the Committee, evolution of suitable weighting schemes for analysis, actual analysis and policy recommendations to the Committee.
- Formal analysis of the preliminary project reports sent by BEL, ECIL and CDIL in response to the Committee Chairman's request for such proposals. Important points for discussion clarification are highlighted in this analysis.

Analysis related to INSAT contract negotiations
(Jointly carried out with Dr Ramani of ISAC)

The contract for INSAT was a firm fixed price contract with an incentive scheme of profit based on actual performance of the satellite in orbit. This total profit is distributed in blocks spread over the life-time of the spacecraft for each of the three main missions of INSAT, viz Communications, Meteorology and TV broadcasting. The main purposes of this study were:

- to ensure that no basic incompatibilities exist between reliability specifications for each mission and the payment profile;
- to suggest suitable weighting factors for distribution of the total profit between the mission which take into account technological complexity and desired mission objectives;
- to suggest how the block shares for the payment should be distributed.

The analysis was such as to provide a guideline for negotiations with the contractors. The main technique employed was Monte Carlo simulation.

Others

In addition to the above, certain other tasks have been carried out. These include:

....more

(1525)

- Analysis related to overall issues of space programme.
- Visits to Universities for discussions on collaboration.
- Comments/analysis on relevance/results of various RESPOND programmes.
- Briefs for Chairman-ISRO for discussions with various departments of government/agencies.
- Write-ups for Space Commission, Cabinet etc.
- Some personnel issues.
- Some calculations on reliability of ISRO sounding rockets and SEO AOCS system.

-ooOoo-

S. Chandrashekar
13/11/79

(~~1224~~) (1526)

Then again ~~a f~~ a note
on my problems of working at
ISRO HQ. ~~In~~ This shows that though
I had been giving some vital notes
to SD, my problems of my future
in ISRO was troubling me.

I had given some options.

Note is dated 16/11/79 — so
close to other notes to Secy to PM
etc. It is marked PERSONAL/
For Prof Dhawan's use only (not
even as Chairman ISRO!) 14 pages

1527 ~~1225~~, 1226, 1227, 1228,
1229, 1230, 1231, 1232
1233, 1234, 1235, 1236
1237, ~~1238~~
1540

(1527) PERSONAL / For Prof. Dhawan's use only.

To: Prof. S. Dhawan
Chairman, ISRO

16/11/79

From: Y. S. Rajan

Sub: My problems of working at ISRO HQ

I request a careful and patient reading of the following since the stress and strain on me have multipled greatly in executing my (?) tasks — even day to day. Much of it is due to the multiple channel operation(s) on many items, which is the mode Chairman prefers.

As regards my technical career I have been pointing out to Chairman especially during the past three years about the "writing-on-the-wall"; my technical career in ISRO, especially during my prime career-life, appears to have come to a dead end sometime ago with key technical positions being filled by many others, who have since formed power-centres of their own. There is, therefore, no question of relevance or otherwise of my technical knowledge or competence...

[P.T.O.]

... It is too late to rectify the situation...

I had been pointing out these things rather starkly with ~~a~~ specific posers to Chairman:

(i) to advise me on a course of action

and/OR (ii) to tell me plainly if he considers me not suitable for the key technical tasks (and better be where I am!!)

Due to the peculiarity of my role in ISRO, I cannot talk frankly my problems to colleagues — at HQ or Centres — or to try ~~to~~ seeking alternate positions: I have pointed out this aspect also to Chairman. Chairman said we needed a long chat alone. A meeting to discuss these never took place except by Chairman saying that my place would still be in ISRO.

... The above being so, I did not let that situation colour my work nor slacken my work at HQ. In a situation over the past two years especially, when things were adrift and guidelines vague, without burying the important issues away from sight or pushing the problem to the Chairman "for instructions please!", I have solved many of them by coordinating

(contd)

with so many at HQ/DOS and outside. (Centre Directors, Other Scientists at Centres etc). To satisfy Chairman in terms of technical analyses — of present activities and future ones — I have spent considerable time with newer scientists to inspire them, guide them etc and ~~path~~ produced considerable technical analyses through them on variety of topics.. Besides these, I have taken care of personell (promotional etc) oppurtunities of HQ staff — senior and junior scientists — especially the generation and movement of papers for the same. Plus I am keeping the small administration at HQ running despite many operational problems especially when the lower staff is being screwed by Governmentalisation (and some senior scientists) — by keeping their morale. It should be noted that all these are done not by me individually but by trying to extract the best from all the staff.

All these are done in a situation when the HQ is made of some prima donnas and when there is no clarity as to whom I

(P.T.O)

(or anybody!) can tell what! Almost everybody reports to Chairman, and anybody can do anything. Some have positively lost interest in many "regular" HQ works and some jump into fray to show off when high level ESA, NASA teams meet leaving the steady and regular follow up to go astray — therefore it is scientific secretary's job!

There is one person in HQ who can define his role as ~~its~~ it suits him "to get a totality of view": — if everybody adopts that mode there would have been utter chaos in ISRO and ISRO HQ; he creates a rucus with HQ colleagues including DOS personnel to achieve his ends. He ~~sno~~ snoops around to see others' mail, many confidential papers in Chairman's office etc — even grabbing it physically from the personal staff of Chairman. He can get away with these and many other "priveleges" because he always quots "Secretary wanted this or that!.. I will report to Secretary.." and so on. There are one or two others who have neglected the operational mode of clearing

ISRO HQ / DOS files etc... All these cracks, instabilities, kinks, distortions etc somehow peak on me — I don't know as "what" — but I need to act as a lubricant, damper or a daughter-in-law of a joint family to keep things moving... Well I could be asked why I did not refer all these to Chairman as I should have.. yes.. though I have brought it up at a general level earlier, I did not do it for specific cases — which are almost day to day — and since Chairman could not have solved these issues in the set up he has. Also it would be more difficult to inform these specific problems to Chairman rather than solving them (!!) because Chairman's feel for middle-managerial operations is ~~are~~ rather poor...

There are many other items on ISRO personnel matters, employee issues etc — I have helped in analyses / solution working with Sh S.K. Warrior and most importantly by guiding the Systems Analyst recruited for this

(P.T.O.)

purpose; I am glad he has shaped well... I consult Sudarsan and Prabhu many times on general approach and also Varadan/Viswanathan etc whenever I feel the need and the systems analyst also consults many... Now Chairman says nothing is done in personnel management at ISRO HQ — because Prabhu does not do it. He never did such personnel management analyses nor is he interested in it. I am not either: I had to fill the vacuum and assist Sh SK Warrior whose prime responsibility is for the personnel management of ISRO as Member-Secretary, ISRO Council. Chairman has seen the various notes I have sent on the subject — be it on VSSC employee question or role of trade union or career oppurtunities of the staff or question of pyramid etc.

... Coming to the Space Sciences and RESPOND partly due to the Chairman's referral and partly due to its importance to ISRO, I have done considerable spade work in roping Prof. Daniel, Dr. Ramaseshan, Prof. Ponnamperuma, Dr. Rangan etc... This is not an easy task. I am happy that some good shape was given to the Origin of Life, Space sciences consolidation, Material Sciences in Space etc. Some in HQ can still say that Chakravarty should have dealt with it all. My role vis a vis RESPOND is

... Contd-

<u>not</u> clear at all; Still I have contributed on issues referred to by Chairman including giving of some general advice to Chakravarty. Whenever I discuss Space Sciences or RESPOND with him, I find that he <u>darts off</u> independent notes to Chairman, who in turn marks some to me to discuss... How can I go and tell Chakravarty to send it to me or discuss with me first..? Nobody is clear on this, — he, me or others... I had pointed this out to Chairman a few times: well things have gone so far...

.. And many such issues <u>almost daily</u> on all matters regarding ISRO (~~on~~ SLV-3 project estimate revision, Liquid sites, or programme profile etc) All these are painful, troublesome and depressing but I have learned to live <u>stoically</u> and to contribute my mite:- get the work done with as many inputs as possible and keeping as many happy as possible In overall technical / managerial integration of ISRO profile etc Sudarsan & Chandrasekhar have been the most helpful to me and Jayaraman Krishnamurthy / Krishnaprasad on many operational issues.

<u>So far I hope there is no complaint from Chairman on the SPEED OR quality of inputs to Chairman on many issues</u>

referred to by Chairman to me — many of them in a crisis mode.

Amidst all these, off late I get STRONG hints from Chairman and through others (that Chairman said) That Chairman is concerned about the internal communication within HQ; that there is no general participation etc. I somehow get a feeling that Chairman is given to understand or feels that I take many action without others' involvement. He refers to discussion with so-called SPAG which historically consisted of all scientists of ISRO HQ except Dutta and the then newly joined Systems Analysts; even Dixit was a member. Major contributors like Chandrasekhar & PN Jayaraman are not there as nothing on the ISRO HQ organisation was issued later by Prg. PDB. Also de facto, SPAG never worked on/nor can work on all activities, due its composition, except budget — that too with Chandra/others. One cannot just refer to SPAG alone

— .. Contd

everything if one has to get the involvement of others too in HQ ... Of course, I could have marked everything to SPAG and sent reminders for inputs and waited; when some inputs come to me I could have requested the Convenor SPAG (Dr. Prabhu) to put them together & send to Chairman. Really speaking then one does not need Scientific Secy, ISRO or Asst. Sc. Secy at all except for admin. signing within HQ for ~~PA~~ P.F. loan etc; even these powers can be delegated to a scientist in ISRO HQ ...

Chairman tells me "You call a meeting of SPAG or HQ .. discuss ... etc" With Chairman's mode of treating everybody the same, and not telling persons directly or bluntly who is the man to integrate (with some discretion } of his own), nobody is interested in a meeting called by anybody else unless they give it to Chairman or he asks it .. Or when Chairman calls for a meeting a free-for-all only occurs. There is a person who will not even tolerate a change of word from his

for his (!!!) portions as otherwise he
will report to Chairman ... Even for <u>small</u>
differences the mode will be "let us go to
Chairman!" ... How can one go through
the motion in such circumstances
when some claim <u>territories</u> (with
fluctuating definitions) and some
"territories" are totally barren!! .. I used
to make the best judgement and get
work done by some right junior scientists,
Sudarsan, Chandra etc and try to show
the final product to Prabhu who can give
some good judgment on many matters and <u>then</u>
<u>only</u> send things to Chairman .. I even take
care of those with <u>territorial ambitions</u>
<u>and sensitivities</u> on every specific matter
because I know the inner working (sic!!) of
those persons ...

Now it is clean with all
these, finally blame could be put on
me more ... Chairman may <u>not</u> do that ..
He will have a <u>nagging</u> doubt in him about
my mode of operation since he is <u>remote</u>
and due to his passionate desire and search
for an ideal system ... I cannot function ... has doubts ~~xxx~~ about me ...

... The question at issue is not the delegation of administrative / finacial powers to Asst. Sc. Secy or Sc. Secy .. these are trivial & these issues are really negligible .. The real issue is that Chairman does not indicate who has the authority to decide at HQ and deals with everything and everybody with an ideal equality .. Let me make it clear that the divisions like Communications, launchers etc are excellent on paper but ISRO is one and at HQ level one needs a single point integration, judgement and discretion (and an authority to do it) other than at Chairman's level before inputs come to Chairman. (Dr. BP on the eve of his departure searchingly asked me what I do as Scientific Secy .. I tried to explain the situation in a roundabout way .. He sharply said .. " that is not right; there should be only one who should report to Chairman! .. " Somehow I defused the topic ..)

The present HQ mode is like running a Project with multiple Project Managers

or a Centre with 4 or 5 ~~dr~~ Directors
or a Centre with 4 or 5 PPEG's ! . . I
am being very blunt because I am at my wits' end and I don't personally like to play intrigues with my colleagues and Chairman which is the only other way this laissez faire ISRO HQ "organisation" can be controlled to function . . . The role of Staff officers is another unclear matter which one person at least interprets as interception of all papers of his interest to Chairman . . .
(INSAT is a matter where there is practically Zero HQ involvement except that I as person is kept informed . . . . I have informed Chairman why I still fulfil the role since a back up is needed when JPS goes abroad . . .)

CONCLUSION

. . . All these said let me not appear to suggest that I need be given more authority. NOT AT ALL . . . Chairman would have problems vis a vis my other colleagues, all of ISRO, or his own perceptions of what HQ is etc . . . As a person therefore after two or three years of alerting Chairman, I have decided to request Chairman to ease me out as soon as he can with, of course, some honour . . .

(R.K.D/Contd)

I request Chairman's help in (order of priority) :-

(i) Getting out to JPL or NASA Space programme at least for 2 or 3 years.. I will try new pastimes — to be lost in a general crowd and at the same time do work in Space which I like.

OR (ii) fix me somewhere in India in an academic institution, industry or Govt department, where I can have some job identity — with no great ambitions which have gone away long ago!!

OR (iii) If both of these are not possible at least to give me (moral) go-ahead to try by myself since I would not start such a search without Chairman's ~~to~~ "blessing" — it is neither correct nor practical in the Indian context.

Also I request that we work out a time table for my phase out, which I would like to take place say in six months Also due to my mode of operation, I will not be leaving a vacuum behind and can effect a transition smoothly in say a month. As I have always promised, till I phase out

(P.T.O

there will be no slackening of my inputs to ISRO (and HQ as a unit).

I feel terrible in sending such a long note to Chairman at a time when he has stresses ... But despite my notes in past three years, we could not discuss substantively on any of my problem; also during discussions Chairman tends to drift on unrelated topics and not listen to my specific problems ... I console myself with the fact that Chairman and ISRO are more resilient than myself ... Before I phase out I have some duty towards my career plan/welfare of one or two ISRO HQ scientists on which I will brief Chairman separately.

A quick response from Chairman would be gratefully appreciated.

Regards.

Raja

16/11/79

(~~1225~~) (1551)

I don't remember what exactly happened with that note. Normally SD does not respond to them ~~to~~ directly. During some other discussions with me he would indirectly refer to some of them — normally a one-way communication, without a discussion. ~~"I~~ such as "You have presented a stark picture.. there are other options..." etc.

The year ends with a note which Chairman ISRO SD had asked me to give after the INSAT meeting "Some critical Items and ~~of~~ important activities. for 3-4 months) dt 18/12/1979

This contains my direct input to SD on the need to change / modify the

(~~1226~~) (1552)

INSAT-1 Project management including the need to ~~for~~ bring Prof UR Rao directly making him full charge .... It was done later with him as ~~Proj~~ Proj. Mgmt BD Chairman. Some more too . . .

Also on Liquid Engine Test Site

1553 ~~1227~~, 54 1228, ~~55~~ 1229. Note 18/12/79

Though this decade ends with this, there is no sharp division. We end 1970-79 ~~80~~ notionally here!

~~That~~ The note above is typed after this.

1553

INDIAN SPACE RESEARCH ORGANISATION **URGENT**

HEADQUARTERS

MEMORANDUM STRICTLY CONFIDENTIAL

FOR CHAIRMAN'S USE ONLY

For : CHAIRMAN, ISRO. File / Ref :

From: YS RAJAN, ISRO HQ. Date : DECEMBER 18, 1979

Subject: Some critical and important activities for Chairman in the coming 3-4 months.

Chairman had asked me in Bangalore after the INSAT meeting to give him a brief note on the very critical issues on which Chairman may devote his time in the coming 3-4 months. I had earlier given to Chairman a list of about 20 items on which action is to be taken by Chairman. However, if one were to pick up the more critical elements they boil down as under:-

1. INSAT

This requires some constant watch not only in terms of details which are going on but more importantly in terms of human inputs and perhaps through injecting different organisational elements into it. Also it would be better to free Chairman by injecting a senior person to deal with most of the regular matters of mile-stone progress etc. So as to give him time to think only about a few critical items such as negotiations with NASA, if any, selecting the right persons to keep the quality of the project without seriously affecting other ISRO programmes, Government interface etc. I personally feel that Prof UR Rao should now be made to take full charge of the project activities and the Project Director may henceforth report to him. Prof Rao then can decide about the details of operations.

There is also a need to have some independent input into the project and not leave everything to the judgement of the project team and Project Director only. This would mean that 4-5 senior ISRO engineers should be in close touch with the project. Amidst their other ISRO activities these persons should visit FACC periodically (say once a month or so)(at least for the next 9 months) and ~~xxxx~~ give their feed-back to Prof Rao and Chairman. I feel that the team should consist of persons like Dr Rangan, Shri RM Vasagam, Shri Ramachandran and Dr Srinivasan.

The critical issues connected with the launch are: the assessment of risks involved in augmenting Thor Delta and making NASA do it for us. Once this is done, the question of bearing the cost for this augmentation need to be sorted out. Though theoretically and legally FACC should bear in real life we may have to bear and Government interfaces on this has to be suitably sorted out.

..../

2. APPLE

Next item equally critical is the APPLE. We have to ensure the CDR dates in February 1980 and that the integrated spacecraft will be taken to Guyana in time. I do not think at this stage we can solve the major technical problems of the project. The only thing Chairman could do is to get a first hand feed-back regarding risks involved which is inherent in such projects. This should be done calmly without panicking the project or letting the related persons go cynical since the risks are high. An announcement at this stage by Chairman that by middle of January he will spend one full day at ISAC (seeing all the hardwares, holding detailed discussions with the team and consult engineers regarding the status and test results of each of subsystems etc) would help in boosting the lagging pace in the project which is occurring due to various reasons. This would also help the Project Director in pushing the matters thus being able to integrate the spacecraft by end of January to meet the middle of February CDR dates. One imponderable is the success of LO-1 of ARIANE. I hope and wish it is a success. If the LO-1 is a failure then we are in a different ball game. If Ariane LO-3 is shifted say by a year some of the technical issues on APPLE could be reviewed to take stock of the risk elements from the APPLE spacecraft. We can perhaps do some more tests and so on. If the delay is only say 6 months then nothing much can be done. This is an item which we can probably take stock around December after LO-1 launch.

3. SLV

The third item in the list is the preparation for the second experimental flight. Dr Gowariker had a meeting at the VSSC on December 11 to arrive at a reasonable time schedule, taking into account the lessons from the first experimental flight. It is necessary that Chairman gets an appreciation of this probably by calling a few selected senior executives and scientists from VSSC & SHAR one day in early January.

4. Selection of the Liquid Test Site

I put this also as one critical item because non-selection of site somehow has a demoralising effect on the team for whatsoever reasons and a mere announcement even would greatly build the team into action. Whatever be the psychological origin of such fears, it is in ISRO's interest to keep the team going with the fabrication of GOT engines. Full funds have been allotted for the task. They can do the task with greater vigour once Liquid Test Site is allocated. I understand that the process of going to Government etc may have to be gone through, which may take a month or so. However,

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if internally some decision of Chairman is known, it would be a sufficient moral booster. As instructed by Chairman, I am doing the analysis and submit it for decision within 15 days.

5. <u>Organisation of future projects</u>

Though a full project organisation for preplanning to ASLV-3/PSLV-3, IRS need <u>not</u> be done immediately by Chairman, it is necessary in my opinion that Chairman calls the concerned Centre Directors and asks them to work out details internally in the Centres and also with some inter-Centre coordination. For ASLV-3/PSLV-3 Directors of VSSC & SHAR are the concerned persons. For IRS, Directors of ISAC and SAC may be called. However, Chairman may have to choose the name of persons for SLV-V & IRS who will keep the ball of planning activities rolling. This would also greatly help in reorientation of activities in the Centres for R&D/facilities in the coming year (80-81). Present ISRO general belief is that SLV-V & IRS are non-starters and therefore nobody seriously plans for it. If the next 6 months are usefully utilised to plan the activities in a planned and concerted manner, I am sure the programme will move through. Therefore in the coming one or two months if Chairman can name two lead persons for these two programmes and also ask the Centre Directors to work out the details, then we are in business. I am aware of budget restrictions and I am sending a separate note on the subject. Also another crucial issue is to move papers for Cabinet approval which will require prior work. I have addressed this issue also.

If the above five issues are handled effectively in next 3-4 months, I think we are in business. All issues be it CISF issues, post creation etc., are all dictated by this issue.

Regards.

Rajan
(Y S Rajan) 18/12/79

Chapter-4 (1970-79)
notionally ends here.

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