

Chapter 4
1970-80 column (680)

One concrete thing in the note is the definition of a Programme office. My note to SPAG members (four of them) outlines what can be done ~~for~~ to cover all of ISRO Programme. I had

given a concrete example for Satellite Technology Development

Again I am surprised at the date Mar 21, 1975 of the note and I had appended it to the March 31, 1975 note.

Of course, I had not given the March 31, 1975 note to SPAG members — naturally

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because it concerns my career.
Definitely that note of mine
would have had an influence
in setting up the Programme
Offices.

I distinctly recall the
big politics ~~that~~ between
SAC & ISSP that took place
on the SEO or ISSP-II
satellite management. On one
side R D Shuman (RDS) from
headquarters wanting to control
definition etc. But more
importantly SAC started getting
into the politics of controlling
ISSP-II. Their idea was to

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make ISSP (essentially URR)
into a subcontractor. YP by
himself would have loved this
proposition as he would have
noticed the ^{national} reception the
launch of Aryabhata got. So
visibility for fame (and thus)
power came through a hardware
project. SITE was ~~do~~ too
diffused to catch newspaper
attention, and therefore a creation
of temporary hype / Icon as was
was possible for Aryabhata.

This problem of ^{greater} attention by
ISRO and also for reward / fame
system for hardware projects continued

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for ISRO. Even those persons / groups which provided key subsystems to satellite projects were not rewarded as much: it was after a sub-system! Much more problem was the relative inattention given to recognise those who do R&D and technology development

Very much more was the problem for those who worked for remote sensing with the users or for communication or meteorology with strong user departments. Though remote sensing applications were just emerging, being experimented by ISRO, this feeling that they would not be recognised by ISRO and eventually for awards would have been intuitively guessed. Also they had low budgets (plenty for work but too less to

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attract higher management attention at ISRO Council etc.)
They were discussed only within the Centre. Even then much more visibility at the Director level would be for high budget projects (and with more manpower addition etc.)

So SAC Director and his higher level advisers naturally wanted to control payload development - having the test facilities for satellite level qualification etc. All in the name of the payload development being closer to the application scientists!

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On the other hand though
naturally the satellite payload
development would have been
better of being ~~at~~ along the
side of Satellite Development
team at Bangalore (in terms of
optimising very limited resources
ISRO could afford in those
days for ~~tech~~ test facilities
or for procuring space qualified
components & etc), if done
~~do~~ so, all of that team would
have been subservient to ISAC,
U.R.R. in particular and his
close associates. The payload

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SAC Director, SAC senior management ~~and~~ would then be relegated to develop applications which was not easy in those days as Landsat (then called ERTS also) data availability was poor and the ~~is~~ visual interpretation of the coarse 70m data (high in those days!) would not ~~satisfy~~ satisfy any Indian user. Those who used the photographic interpretation were used to ~~use~~ aerial data which was very high resolution.

And for satellite communication after SITE was over there was very little availability of a SATCOM

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Channel. There were plans underway to try for an experiment for one year with a Franco-German satellite called Symphonie. The experiment like SITE was to involve telecom department (then called Post & Telegraph P & T) dept) in actually experimenting with geostationary satellite (the long delay in ~~the~~ voice reply going up 36,000 Km & returning to earth) was expressed as a concern in those days. But then would appear ~~and~~ a mini-projects compared to Satellite Projects

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and the emerging Launch Vehicle projects like SLV-3 and related facilities in ~~SH~~ Sriharikota (SHAR) and Vikram Sarabhai Space Centre (VSSC) In terms of budget they took away most of ~~the~~ (about 85%) ISRO Budget.

So it was natural for YP and SAC para centres to aspire ~~for me~~ for ~~contract~~ acquisition ~~(administrative)~~ of administrative/managerial ^{hardware} paras for big projects (visible for outside world of ISRO). SD's method of middle ~~to~~ path managed to have a half way house. SAC got the ~~for~~ Applications related payload projects. But that subsystem

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has to be under control of
^{concerns}
the Sahllite Project. The payload

Project ~~Mgr~~ Manager / Director comes
under direct control of SAC Director
- administratively, for writing ~~conf~~
annual confidential reports which
are crucial for promotion etc.

But the overall Sahllite Project
Director reports to Director ISAC.

To have a participatory
management there was a
overall management council
for the ^{Sahllite} Project ~~in~~ which includes
Payloads. That was chaired
by Director ISAC. He thus wields

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wields the power, albeit through a "collective" Council mechanism.

Director SAc would have liked

to be that position, in which the Centre of gravity of "power" would shift to SAC...

At a young age I was privy to see such "power-play" and methods of tackling them at least for that Project. Such tensions resurface for each project. In one sense they were no different from the political power control by the politicians in the Cabinet etc. and if not in Cabinet as a

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as a member or Chairman
of Parliamentary Committees.
Human desire to dominate
appears to be the same!

It appears from the
notes I had sent to PngSD
and also from my memory,
I had become deeply aware
of the dynamics of power structure
(mostly tribal politics) within
ISRO within about a year of
my coming back from NASA (USA)
to India, and especially ISRO HQ.
What I had gone through in
SAC, in ISSP Project, and within
the incipient formation "soup" of the

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~~and~~ of ~~the~~ ISRO HQ, had given me a clear idea of what was going on and what was my fate.

But I was fortunate that I did not have to sit quiet and sulk or sit quiet and work like a gamma or delta moron in the organisation. I could see many ^{persons} in ISRO had started that mode already.

Good young Indians having got a good Govt job with ~~per~~ retirement upto 60 years when rest of Govt was some 55 years, transport facilities (medical facilities

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were poor except for VSSC then,
but too young to worry about
health facilities!) They can
crib about their bosses, some
team member, do some gossip,
and enjoy the subsidised meals
in ISRO canteens etc. and
occasionally show their
~~ages~~ aggression in ~~some~~
many of ~~the~~ technical review
meetings which were getting
systematised under SD's regime
as Chairman and during the
time they fight for budgets!
Some local heroism.
Fortunately ISRO's

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projects were well structured
and focussed — lots of
credit to SD & BP's ~~func~~
management and leadership.

The ~~rev~~ review processes
ensured that the subsystems
and the work even at the

lower most levels of technical
hierarchy were related well
defined. So the 4 gamma &

delta missions ~~we~~ were able
to deliver products — the

alpha, beta missions had been

a small number enjoying the

benefits of it all and fighting
to keep their terrains and ^{try to} expand

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their territories.

One thing was
clear: I was not ~~gamma~~
 β beta-, gamma- ~~or~~
delta mutants (of the
to Brave New World
of Aldous Huxley!)

But ~~a~~ an alpha
mutants with some mutant
genes! That was the problem.

One of the excellent
narration of my perception
of ISRO written as hand
written notes to Prof SD
dated 4/7/75 is ~~att~~ available

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and is attached as continuity
of this writeup. What I have
is the handwritten draft as
I do. ~~As~~ Since the contents
had ~~been~~ been too personal
on a number of top ISRO
persons, I would have

(as was ~~the~~ my practice
to give the ~~newly~~ freshly
written copy to Proj SD)

That is one of the papers
he had not returned to me, for
understandable reasons!

But I have the draft

It follows in the next pages.
While too persons since it is more
than 40 years now, ~~there~~ is it
is perfectly in order to bring it
in public domain as archives.

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It is not necessary
that I was right in my
assessment. But it ~~is~~ was
the result of my integrated
perception; looks to me
as ~~a~~ rather a ruthless
analysis (even as I read
now!) But I won't say
that even now I won't
say my perception later
and even now would be
close to it, with some
nuances which I may add
due to the experience of life
~~to~~ I had since 1975!
(Copy Note: 4/7/75)

To: Prof. S. Dhawan (698)

4/7/75
Ref:

From: Y. S. Rajan

Sub: ISRO's personnel management - an introspection as an individual

1.0 For good or bad, I have been with "ISRO" for more than 10 years (~~either as~~ ^{from a} Research scholar in PRL to what I am today). I have deep commitment for ~~ISRO~~ ^{ISRO} and for India and for ~~India~~ ^{ISRO} - a deep and sincere feeling that exists in me ^{many a times I feel sorry for this commitment.} I am not able to decipher at all. As I watch things go by, the only consolation I had a few months back ^(about 2 to 3 years) is the Plato's philosopher (intellectual) ~~being the~~ "ruling" ISRO. But what ^{the regime} ~~has~~ ^{has} given done ~~per se~~? ~~As~~ ARYABHATA ~~and~~ in its totality and ^{to} some extent SITE; ~~the~~ for the former I need not explain anything more. For the later, the Plato's philosopher has mainly contributed in terms of governmental interfaces and good-will, which would have been mucked up, had the approach been the ^{holier-ignition} ~~holier-ignition~~ style which existed before. For SLV-3, the major input has been to set up a system, but the human mechanic

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of it is yet to take shape, if it has to be a success.

2.0 Leaving apart these physical targets for a while, let me just turn my eyes into the power structure or personnel position of the organisation. The reason for doing so is the aspiration of ~~an~~ an individual, who wants to see some bright ~~spot~~ spots which can keep his hopes alive. I am sorry to note (at least from ~~the~~ my look angle, which I think is greatly unbiased or uncoloured) that the power structure within ISRO has not changed from the time of Dr. Sarabhai ~~at~~ except for some some important (powerful) ~~inputs~~ ^{element} ~~inputs~~ at Space Applications Centre. This ^{element} again had to lean on on earlier elements essentially mentalising any change from the old power balance.

2.1 What is wrong if the old power balance has not changed? There is nothing wrong ~~to~~ ^{per se} with ~~anything~~ ~~old~~; but this particular "old" ^{per se} "set-up", as I look at it, has been based upon personal power equations wherein the ~~meritocracy~~ merits (or even honesty) has ^{very} little chances for surfacing. This is a serious conclu

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to arrive ~~at~~ at, with grave implications for my own future plans. I am giving below some data (and interpretations) on which I base my judgements.

3.0 This data base has to be ~~to~~ generated essentially ⁱⁿ persons (in power) wise; ~~or~~ I just ~~take~~ start from VSSC.

3.1 Mr. Kalam: It is a good thing for SLV-3 to get a manager. ~~and~~ Selection of some persons out of the contenders was impending. Whether the decision was radical cannot be judged because Dr. Y.T. Rao had his empire at SHAR ^{and others had their own.} by that time. ~~In~~ Mr. Kalam's own method of operation, I see a great faith in ⁱⁿ tribal mode of working; loyalty to the leader ^{in the only touchstone}. Also controls ~~over~~ divisions are being done ^{mainly} by ~~subversive~~ "subversive methods" of playing up on the frustrations of engineers in divisions in ~~war~~ and so on. [I should add ~~that~~ that I don't suggest by this that SLV-3 would fail. Not at all. May be these methods work. What I am viewing is the methods ~~or~~ means with some ~~no~~ moral yardstick or value judgement. $\frac{3}{2}$ Ends. ~~as~~ can be

Very
⊗ with less reliance on analysis and reason.

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achieved by various means
— at least immediate ends!]

3.2 Dr. Gowariker : Some Intellectual content and charisma to a good degree; but combined with enough bluff and politicking. Vis-a-vis his own personnel, his style has been probably the best.

I don't know vis-a-vis others. Is this goodness flowing mainly because they are his people? We can give him benefit of doubt now. But ~~the~~ in the initial days of establishment of PED, the rat-race between Dr. J. Rao, Dr. Muthu-
nayagam & Dr. Gowariker, for pushing up their people by accelerated promotions because they were in ~~a~~ powerful positions with Dr. Sanabhai, does leave dots of doubts as to his view of ~~ISRO~~ ^{when it comes to} ~~merits~~ ^{whole of} ISRO, where everything may not be under his control.

3.3 Dr. Muthunayagam : Perfect Mafia type organisation. Still I at least feel happy that he & Dr. Gowariker have brought up some juniors (whatever be their criteria for selection!)

3.4 Dr. Gupta : Wants to have control over ~~the~~ every activity of subordinates. To achieve this all "opposition" and thought processes have been carefully eliminated.

krishna

in a general
ISRO sense,

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by administrative means. To gain control in Avionics also has pushed up Dr. Kulkarni, ~~who probably~~ to head ELD.

3.5 Mr. Aravamudan: Coming to top at TERLS was a sheer accident of ~~the~~ large depletion in the upper crust of TERLS. (M. Murthy, Mr. Easwaran, & Mr. Kalam). Got it being in ~~the~~ queue. ^{He is as a person administratively} Otherwise, technically honest and applies the same yardstick to all cases [An oddity!]

3.6 Mr. Vasagam: An intellect that has been "used" very much, but pushed around too much. How much these tortures have affected his personality, I don't know. In spite of ^{being} capable and ^{long with ISRO} ~~for long~~ from the beginning of ISRO, ^{into Kale's call (are qualified)} was not considered for heading a major chunk of work, probably because he did (does) not conform to the power equations ~~nor~~ nor does ~~he~~ he have a power base (or pulls). I am glad that at least he heads PPEG, but what it is with 5 or 6 scientific staff, for a talent like him!

3.7 General VSSC: It is too big to deal one by one. But by and large the division heads and their men are essentially at the helm of affairs. There are ~~not~~ infights without affecting any essential elements of the power equations; ~~the~~ the fights are more on empirics ~~not~~ not on technical questions. There are many talented, hardworking junior

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engineers who never surface, because the Division heads have managed to have a flock of 200 people ~~at tasks~~ where the need may be 100 or 150.

This helps them ^{heads} to keep "them" ^{engineers} under control". This is a general philosophy.

I don't think a rationale exists in promotion or boosting to important tasks, other than "loyalty" ^{entirely subordinating} ~~and a cross~~ ^{statistical} technical reasoning.

In the reported analysis of 70% being happy should not make us unduly happy because ^{percentage} happiness ^{alone} is not necessarily sufficient an indication of their efficiency, ^{health,} or

intellectual vigour of the organisation. Like it ~~is~~ or not a core group ^{creative} of thinkers or "elites" have to be reasonably happy

if an organisation has to be vigorous by healthy in the long run ^{besides the bulk being generally happy for obvious reasons.} [This core group

may be only 15% to 20% in a set up, and one has to analyse as to their feelings. ^{This cannot be isolated in terms of grades. One has to select talents to see this lot.]} As I see it, I don't

find much hope in VSSC for such creative thinkers ~~to~~ without sticking on to a Mafia leader. Again since the ~~is~~ interdivisional or inter-project links are still on the basis of power equations of divisional heads, and not

on intellectual strength ~~about~~ there is no need for these thinkers in this game of power balance. These chaps can continue as toilers.

SAC, SHAR etc are no exceptions to vis modus operandi.

3.7 SHAR & Dr. Y. J. Rao : There were ^{vague} general allegations of regionalism on which one cannot be very sure. But the modus operandi in SLC, ~~SLC~~ etc does not seem anywhere near an R&D organisation. ~~The~~ The engineers are being treated as ~~the~~ clerks in a talk office. This greatly contributed to confusions ~~to~~ during Aryabhata work. Chairman's installation of Venkatachary worked because ~~because~~ (ONE) Venkatachary is compliant and (TWO) most importantly chairman was overseeing. These problems will repeat because the entire work is seen as an exercise of administrative power. The other ~~of~~ two power points are being eliminated from SHAR; I hope Jayamani & Magumden survive the onslaught, not just individuals ^{which they will} but in terms of ^{their} work output.

3.8 Pm. U. R. Rao : Dynamic and volatile ^{Not particularly intellectual or appreciative reasoning.} person. ~~Has~~ survived to deliver goods only because of movement to Bangalore and the tutelage afforded. Though not good in personnel management, a hard worker. This devotion to work (partly born of ego) ~~to~~ will work against this man in the global power balance equations. The attacks on him by various people is an interesting combination of jealousy and fear of ~~the~~ hard work. But this person is unique in himself and can survive in the system. Since he himself ~~is~~ ^{continually} fighting for survival, I have doubts whether he can bring up good people whom he has

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8 in good number.

collects for his work. Also having doubts whether his ~~mode~~ "changing ball" mode is conducive to intellects to come up.

3.9 Ahmedabad:

3.9) Proj. Bhavsar: No great analytical or intellectual capabilities. Boost got in Sarabhai days ~~is~~ still continues. Much of his power comes because he knows the power equations ^{very well} between the various powers - that he and does not upset anything ~~and it is~~ even if it means reaction.

3.10 Mr. Thakore: Same as above. But also very skilled in ~~disturbing~~ ^{perturbing} the power equations without destroying them, so that he can derive more power!

3.11 Proj. Chitnis & Lot. Pant: Skilled closed room power controllers. In their own silent way, bring up only their own people ~~for~~ ^{positions of power} ~~not~~ ^{not} based on merits.

3.12 Mr. Kale: First big push from Dr. Sarabhai when taken from a Research Scholar to SD2 scale and Head of ELDS/SSTC. The ball rolls. Not so systemic in thinking as he is not unbiased. Reads a lot and vomits back without discriminations. The power equations always favoured him because the old group (Proj. Chitnis, Proj. Bhavsar, Mr. Thakore) do their best to protect. Has skilfully managed to use this tutelage to develop new contacts & power equations (and skilfully throwing out competitors by secretive backdoor works and use of power-position to take away works from others and depicting as his own).

The systems ~~is~~ ^{is} ~~based~~ ^{based} ~~on~~ ^{on} power base.

Young for ~~them~~ ^{them}

access

chaps "can work"

3.13 Director SAC ~~has~~ has been badly looped up in the midst of above personalities and it will be very difficult for him to get out of or change the equations.

3.14 Mr. Calla: Initial small boost by Dr. Sarabhai. Has ~~clay~~ clung on to power by sheer tenacity and hardwork. NOT a great intellect but generally honest. I wonder how much will he have to survive!

3.14 Wg. Cdr. Rao & Dr. B. S. Rao: Were always odd-men-out in ISRO's general power equation (more so in Ahmedabad). No wonder they are thrown out!

4.0 With the above data, what can I conclude

3.16 Recent additions to ISRO's middle level (SE, SF etc): Hariharan is too honest to be ^{treated properly} ~~in place~~. "TIFR axis" in RSMD is too obvious. Another thing is the way some "juniors" are chosen in SAC or SLV for secretariat level positions. Even additions in HQ and assignment of tasks raise some questions.

4.0 Let me tell my own story. I consider myself as a reasonably rational person with good intellectual capabilities and honesty. Have found bluffing & ^{publicly} ~~ignoring~~ very difficult and in fact did none for the whole decade of my career. I believe ^{only that} ~~in~~ hard work, intelligence and reasonableness (as against ~~honesty~~ ^{should be} ~~tradition~~) ^{are} the criteria of ~~good office~~ ^{a person} ~~meant to be~~ ^{come up in office life.}

through things!

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increasing the "middle level" or "high level" ^{tryp} ~~external~~ ~~perpetrate~~ periodically, ~~see~~ by increasing the competition in ^(consequence) their immediate proximity ^(below them) which is a great safety for their positions from balance. ^{Noted} the external inputs have to ~~rely on~~ ^{lean} on the existing power-structure to get established.

6.0 If I make ^{my} quick sum of the situation, the ~~the~~ writing on the wall is ~~very~~ clear (i) The power base or equations in ISRO have not changed, with "high management" circles being composed of persons who were ^{put there} ~~around~~ ^{or by chance of nomination} around 64-66 due to historical reasons.

(ii) The ~~IS~~ ^{internal} ISRO person raising into these levels by merits or replacing some of the scarce responsible levels available (due to heavy budget crunch & saturation) are ^{those to} ~~not~~ ^{due to the prevailing rule of standing in} queue ^{and not} upsetting the historical standings.

7.0 So what do I do? What are the chances of my raising in this organisation? Let me recall that in spite of my ^{major} contributions to SITE, I was not even given a title ^{in the Project which I returned} which matters a great deal in this ^{new} rat-race. I should have no illusions about my stand on the satellite Project either; the rules of this rat-race are clear as I have shown ~~to~~ above. Unless I can see these "rules" ^{of the game} being changed, I don't see much hope in the organisation. . . . A very painful ^{by} and ~~so~~ tragic conclusion for me ^{as an} individual; The only ^{and} consolation may be that ~~to~~ I am not alone in this bleeding of heart or "bearing of cross". There are a few stake in ISRO - competent ~~and~~ fellows - who bear the cross in dark. So I leave the question ^{to} you, while wondering what I should do next! . . . For the sake of ISRO, I don't seem

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I wonder how I managed to work even with my stark assessment of ~~the~~ ISRO's ~~human~~ HR operations and my possible role (with ~~no~~ no tribal power base)

Maybe ~~and~~ I derived my strengths because of my unique relations I had with SD and BP. How could a small young person (31 years ^{actl} / 34 years on record) give such a note to ~~a~~ go. a powerful Chairman (55 years then)! It also ~~talk~~ talks of the greatness

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of SD! Now I would say
that ~~to~~ God had been
with me all the time
protecting and helping
me to fight through most
difficult situations, in
many unknown terrains.

Ironically that was also a
period when I was de facto
agnostic (not in full form)
but more in a Buddhist sense.

Not that I did not have
an exposure to other great
saints and philosophers of India.

Also all the while the two

"self (712)
persons, implanted" into my
mind / brain since my childhood
(10 years and 13 years) were
Subramania Bharati and Swami
Vivekananda. ~~Prof.~~ Therefore I
was not an agnostic in a technical
sense. I was since so
many things had to be
done for India and Indians
(as broadly envisaged by
~~Sri~~ Bharati & Vivekananda)
in the matter of upgrading
their material life and living
conditions, I was more emphasizing
on those for my orientation.

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Thanks to the ~~the~~ visionary -
communication of Vikram Sarabhai
(right from my age of 20 years in PRL)
I firmly believed that achievements
of the profile of the Indian Space
Programme (though broadly
states 1970-80 profile of VAS)
~~that~~ would benefit Indians
a lot. INSAT, Remote Sensing
were such examples.

With ~~the~~ SD who
had a broadly leftist (not
aligning to parties of those days)
and Buddhist orientation of
philosophy of life coupled
with practical values of

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Scientific processes of the
Western civilisation, I was
very much oriented towards
achieved concrete results
for the country and the people.

The technological challenges
of the front line (measured
in global standards) challenge

Space technologies of which were evolving

also gave a great satisfaction

of adventure: partly an

excellent way to sublimate

the alpha motion tendencies towards

outside ~~at~~ non specific

targets! "We want India to win"

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"We can do what USA/NASA does
or Soviet Union does!"

"We master difficult technologies
for Indian use — our own ideas" etc.

All these were the driving
forces as well as forces which
would remove the ill-effects
of ~~internal conflict~~ organisational
internal conflicts and the reality
of a ^{possible} gloomy future, personally for
me ~~within the~~ in view of the
~~exit~~ (then) existing organisational
tribal dynamics!

It was also perhaps
a training ground for me to
face many such ~~in~~ situations later

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in my life. Whether ~~it~~ such happenings and situations ~~are~~ ~~were~~ ~~common~~ were (are) common for everybody or only peculiarly specific to me, I do not want to speculate (or even investigate). I have lived those situations and emerged out!

But when ~~a~~ a number of persons had come to ~~my~~ me for advice, I found that they had similar situations; I ~~perhaps~~ had to infer (if not conclude) that such situations are a common feature (in India at least with which I am familiar).

*

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Even without me being given a specific ~~role~~ title of overseeing all of ISRO activities, I had started taking upon myself the role of reminding SD (Chairman ISRO) of the critical items he had to attend to ~~to~~ ~~suo motu~~ My notes to him were suo motu!

He did not object to them though he did not respond to every one of them.

From one the ~~note~~ notes I had ~~to~~ (returned by SD to me ~~just~~ before his retirement) — ~~what~~ such notes kept by him carefully and returned me a couple of days before he (P.T.)

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documents his office are the rich resource material for me to authentically cross-check my memory.

After the ~~last~~ big ~~load~~ burden of Aryabhata and Bhaskara initiatives had started, SITE initiatives etc, SD's attention had been largely on INSAT - to have it ~~init~~ coordinated, get approvals etc. In many ways, INSAT had just started consuming a lot of time of SD, so much so during 1980's, P. Sudarshan in his own thunderous & causal way ~~that~~ coined the word ~~INSAT~~ "INSATification of ISRO".

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~~It is good.~~

It is surprising that I had noted ~~this tendency~~ the "shoots of this tendency" during end 1975. The note is of Dec 24, 1975 titled "Important action items for Chairman in the coming weeks"

& The note starts like

this:

"I am aware of many of the activities regarding INSAT which would take much of your time. Still I believe that it is important that Chairman gives some attention to the following points during the coming weeks, in order that ISRO programmes would not suffer. These are as urgent as INSAT."

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Items & ~~expts~~ listed are ~~in~~ in small paragraphs (two pages in all).

1) * Need for continuous monthly review of SLV project: concerns are judgemental errors by project, interface with SHAR & VSSE divisions, need to maximise intellectual ~~the~~ inputs into ^{the} projects (I had ~~the~~ ~~submitted~~ in the paper para - partially initiated)

2) Project Scientist for SLV (This is a NASA style - Role of defined in attachment to the note) Names suggested: Dr. Gowanker or RM Vasagam

3) Giving shape to Liquid programme programme in a full fledged way

4) Holding total review of SEO (Satellite for Earth Observations - which became Bhaskara after launch) - concerns of interfaces given

5) Piggy Back payloads for SEO (DCP - Data Collection Platforms, sciencia payloads) etc

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- 6) Start of work in Shipborne terminal: need to involve VSSC in a major way to evolve technical specifications.
- 7) Formation of intensive Study Teams for APPLE. (Handwritten: Done).
- 8) A "review" of working modes and under-utilisation of some important persons in SAC, in view of re-organisation, especially for the Projects STEP & SED and general mobilisation of remote sensing activities.
- 9) Project Specialist for SED — named Dr. Harisharan
- 10) Mechanisms to form a strong systems group in meteorology within ISRO; may even be outside SAC
- 11) Review of PRL programmes and its impact on science programmes of DOS (Handwritten: Action on us first)

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- 12) Review of M-100 rocket programme.
- 13) High Reliability ~~Comp~~ ^{aw} Components screening_h in the greater context production of indigenous Hi-Rel components. Our efforts to get ECIL, BEL, ECIL, CIL etc for screening have been in vain.

Would you like to take it up with Prof Menon to shake up the huge lethargy in coordination

- 14) Some thought from Chairman ISRO to Centres on starting electronics production activities ... as elements of technology transfer are involved reference to a note by Dr. V. Siddhanta.

14) More later, as these get completed."

"As per my practice, I ~~did~~ ^{did} not "bug" Chairman ISRO on each item. Even sending such a note

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inscribed CONFIDENTIAL waste
audacious enough. On some SD
may give feedback. On a number
of items he may over a period
of time say some thing. ~~Some he~~
On some he ~~may~~ ^{might} have been
doing some thing and might
not be telling me. But I
was to keep ~~that~~ track of them
and drop some over a period
- some done (maybe partially);

~~Some~~ on some no movement!

But even ^[now @ 2017] when I am
seeing the items listed in end
Dec 1975, I feel about some
missed opportunities for ISRO:
meteorology, DCP, ~~etc~~ Hi Rel
programme & electronics production.

(724)

Now (even around this 1990's when
satellites & communications got well initiated) India
was importing most ground equipment.

It is so even now for DTH etc.

Also Meteorology is still weak in

the scientific aspects - that was due
to peculiar power struggle within ISRO HQ

as to ~~IT~~ "areas of dealing with"
Earth observations, INSAT etc. In

fact, Prasad after his retirement
realised it, asked me for a total
picture of EO - I had given ~~it~~ him
an elaborate note; that will come
in 1980-90 part.

May be perhaps SD was
not able to cope up with the demands
of INSAT - internal coordination within
Govt departments (that was the
period of Indira Gandhi as PM with
lots of turmoil of chaotic opposition,

(725)

Sanjay Gandhi ~~emerging~~ RK Dhanwan
ek emerging as extra-constitutional
authorities, lata & Emergency dui
1976 ek.) SD himself had
direct access to PM. But he
would have ~~to~~ inputs from other
departments. His concern would
be to coordinate without controversy
even lata: therefore involving Planning
Commission etc. Then global
purchase (tender etc) would be
involved, good be a landmine
of privileged accesses, para-pressures,
corruption etc! Then internal
struggles within ISRO as to who
would handle. Then a huge
amount of technical work
crucial to get a good system
after a global tender: I played
a few very important roles too!

(726)

INSAT work was equally important. Though it was ^{going to be} a totally bought out satellite, it was essential ~~as~~ as such an operational satellite alone would have ~~the~~ given actual services to the end users. It would have been well nigh impossible for ISRO to have mastered such a satellite making capability even ~~with~~ by 1985 (a decade before ^{that} we had started seriously planning to buy INSAT).

In fact such an ultra-high-sounding self-reliance slogan by Electronics Dept; DRDO; CSIR "We will" "Our scientists will do R&D and we will have our own indigenous, Indian designed systems — such as aircraft, weapon systems or Industrial equipment/plants etc... None of

(727)

None of them ever delivered; mostly they published papers or at best came to prototype or pilot plant stages (which were themselves obsolete when comparing the world-wide achievements in that area!)

On the other hand the public sector units like BEL, HAL, HMT, HEC etc which were heavily funded by the GOI (with tax payers' money and ~~aid~~ aid money from foreign countries and loans) got stuck to the total import made and continued with their import dependence which made ~~them~~ their products obsolete ~~or~~

(728)

(rapidly) over a period.

The debates which ~~are~~ ^{were} small in number were only between such total ~~self~~ self-reliance, stoking ultra-patriotism (as a cover for their ignorance!) and import (those who supported imports were termed as import lobbies by the 'science' groups).

The IAS bureaucracy which really ruled would have had their hearty laugh in their own closed groups and funded both the ~~the~~ groups. The import dependent PSU's and ^{relatively} small sized private sector (like Ambassador car, etc) were

(729)

the backbone of India's development right from its independence: for building roads, dams, ^(making steel, opening mines) electric power stations etc.

~~It~~ Though I was relatively much more conscious of many ^(than the scientists/engineers of ISRO / others) aspects of economy & geopolitics etc, it was not as clear to the dynamics of such items as they had been evolving (or getting entrenched?) was not fully clear to me; nor it was so much in my "radar". I had also been glibble ~~to~~ to take the usual govt / political / economist-elite propaganda about the planned growth and the achievements of our PSU's.

(730)

But I was aware (as were many others in ISRO) that we are different from PSU's, even Atomic Energy, DRDO - CSIR, DSTek ~~was~~ were not even in our radars.

We were "clear" that we would have to import when required but we would not sit quiet with that stage. We would try to do more of our own. We would like to design ourselves even the INSAT to meet our requirements. ~~Our~~

Training of a few engineers at ~~MIT~~ for ISRO-MIT studies, at NASA etc was to acquire such

design capabilities. Doing our own satellites ~~so~~ like Aryabhata, SEO etc was to give us all

(731)

the experience of developing the hardware, testing them etc. SLV was also in that direction. So was our planning ~~to~~ for APPLE satellite so that we get experience of making our own three axis stabilised satellite and also to have the capability to take the satellite to the geosynchronous orbit.

No doubt we had to import ^{space quality} ~~some~~ electronic components, some subsystems, some test equipment, some ^{special} machines, computers etc. But we had our eyes focussed on ~~the~~ CRITICAL

(732)

items with an idea to master development of those items by ISRO.

In this way ISRO did not get into the paradigm of the extremes though the ~~word~~ word self-reliance was used in ISRO write ups — more ~~to~~ in consonance with the "political aspirations" of those days — though the extremes of imports of almost all items for ^{macro-}economic sectors took place and on the other ~~to~~ hand govt funded national laboratories kept on mouthing self-reliance slogans and did very little: even a small items was hyped to show India was getting self-reliant.

(733)

Thanks to the stoic self-restraint of SD, ISRO did not get into that game. Thus it was able to achieve operational status ~~due~~ soon — through a mix of foreign satellites like INSAT, foreign ^{for Indian satellites} launches through ~~the~~ Soviet vehicles, later through ARIANE starting from APPLE launch.

Post-INSAT (purchased ones) ISRO's satellites got a lot of indigenous content, totally indigenous system design etc culminating in the operational IRS (Indian Remote Sensing satellite) IRS-1A (launched in March 1988) SD was not chairman then.

(734)

~~to~~ But the path was laid by him
During that period, Indian made
INSAT-2 (replacement for
imported, operationally serving
INSAT-1 series satellites)

were in various developmental
stages - ~~drawn~~ from drawing
board to various hardware
testing. * *

Such a visibility was
not there during mid 1975. It
was a hope and of course,
structured concrete work, with
a lots of uncertainties - failures
and successes - , internal (ISRO)
conflicts some very healthy and

(735)

Some not-so-healthy (bordering on extreme selfishness, some inter-tribal animosities etc!).

My note to SD during 1975 (March - December) quoted above have to be viewed in the context of 1975 which was the year during which SD laid many & firm foundations for future ISRO and cleared ^{the} ground for possible new paths to be followed. (They became lightways later); ~~Some~~ some ~~were~~ ended up in cul-de-sac (e.g. our efforts for large scale electronics production, starting of Hi Rel component development)

(736)

Though I was not clear about the emerging ^{elements} fully (there was no clairvoyance!), I had some reasonable systems idea. They got shaped through the mentorship of SD, often without specific ~~for~~ preaching or broken-down-tasks to be completed. It ~~is~~ was by living through various activities of ISE, reading, thinking and also structured writing on specific items (my notes to him were also of that category) etc.

Though in my Aug 7, ¹⁹⁷⁵ ~~1975~~ note to him ~~have~~ I had attempted to look at my own

(737)

future which appeared grim,
24 Dec 1975 note B was full
of confidence and passion for
ISRO, pushing Chairman ISRO
into action - almost as a
~~man~~ school teacher reminding
the students of their home work!
~~Though~~ Even in later phases
though there were many
oppressive and depression-causing
situation, overall theme was
~~the~~ about pushing ISRO
forward! As if D had a
great role ~~in~~ for pushing it,
even though there was no
defined position! (P.T.O)

(738)

The young scientists/engineers recruited forming ISRO HQ (some seniors as SPAG members) and others energetic analysts for ~~to~~ running the ISRO HQ for analysis, massive budget exercises, reviews etc, did not yet have any ^{formally} defined roles.

Suddenly, totally ~~and~~ unexpected by me came an ~~order~~ office order dt 30 Dec 1975. very small with two small paragraphs. ~~about~~ ~~Subsequent~~ It ~~was~~ referred

" Subsequent to Prof P.D. Bhavsar's transfer to ISRO"; the items ~~dealt with by~~ ~~referred to~~ Scientific Secretary ISRO will be referred Chairman ISRO.

The second para reads:

" Shri Y. S. Rajan is appointed as Assistant Scientific Secretary, ISRO,

(939)

with effect from January 1, 1976,
~~antif~~ until further orders."

It was signed by QSD himself
as Chairman ISRO.

~~Do my career~~

~~The~~ This was a great
turning point in my career
which was not fully grasped
by me then; partly because
~~for~~ Prof PDB as Scientific Secretary, ^{ISRO}
~~did~~ had very little interaction
with the ^{major} critical activities of
ISRO be it satellites, launch
vehicles, INSAT etc. He mostly
confined himself to space
sciences, and soundly rocket

(740)

allocations and being the overall administrative head of ISRO HR for controlling administrative and financial/account matters.

The role SD had envisaged for Scientific Secretary ISRO was so innovative and transformative (for the organisation) which unfolded rapidly later. On receiving the order, I went to him, briefly thanked and asked "Sir, what do you want me to do?"

He made ~~a~~ his specially reserved ~~U~~ ~~smile~~ smile (upward U), "Good luck! Go ahead! You will know!"

(741)

My good friend Dr. K. S. Prabh
newly joined to ISRO HQ directly
from outside, has a great
sense of humour, though
he ~~does~~ did not talk much
or often.

"Rajan, what a ~~word~~
wonderful abbreviation your
new title gives! "~~A.S.S.T.~~"

It was A. S. S.

In a sense, KSP's humour
was also right; I had to
become, often times, the
donkey which carried the
load (dirty clothes to
building materials!)

(742)

At that I had just
crossed ~~2~~ 34 years (on record
32 years 6 months). I was
still in the SE grade. As
pointed out earlier, I had not
bothered about fighting for
the grade and later promotions.
My promotions got delayed.
For SE to SF, there were no
interviews in those days, as
the numbers were small. It was
dealt with by the ISRO Council.

As if some fortune
was being showered on me, I
got on 1 January 1976 ~~and~~
a letter from ~~SD~~ Prof SD that
I had been promoted to SF

(743)

with effect from 1.1.1976.
Probably P.J.S.D who had observed
me since my coming from USA
(he had also got a number of
feedback from NASA persons)
since ~~to~~ early 1974, had two
full years to judge me for
a critical position of Scientific
Secretary ISRO, which he
was going to shape but for
which he had to patiently
wait till P.D.B left. Probably
S.D did not want to take
a chance by putting somebody.
He had watched me through
many phases and also as to

(744)

how I performed ~~the~~ vis-a-vis other colleagues in ISRO, how I was judged by many other senior persons of ISRO, right from VSSC, SHAR, U.R. Rao, ~~SP~~ YP, ~~and~~ others:

~~That~~ I was happy with these developments. But I also recognised the limitations of the work in ISRO HQ, though it was ~~the~~ vital in the scheme of things of ~~ISRO~~ management of ISRO, which SD had envisaged. I was for him a key element, with acceptability across ISRO and with fairly good exposure (knowledge) in all

(745)

areas of ISRO activity.

I had

I had explained these to Proj 80 rather plainly several times before and even after these two important orders.

There is a note from me to him: PERSONAL / ~~strictly~~ Strictly Confidential date 10/2/76 titled possible assignments.

cc A small covering note says

" As explained to you earlier, I don't think ~~that~~ there is a crisis in my HQ role for another couple of years, unless I am boxed in

(746)

into "service" role to others by
usage of key words like ESA,
communications, applications,
technology, satellite etc.

I have attempted a
scenario of possible roles, with
~~the~~ realism. I hate to
blow my trumpet; trust
this does not pierce your
ear drums #
Regards.

Rajan
10/2/76

I have a fairly detailed
note: first giving my
career profile in ISRO 1964-onwards
very brief ^{tabular form} describing the
role as "Line" or "Staff"
or "Line / staff" etc.

(747)

Then I give "Possible future activities" about 4 of them which, I describe as ~~not~~ not in order of priority. Also for one ~~to~~ of the preferred item - I had given details. It mixes "Line" & "Stuff"

~~is~~ That typed note starts with a para.

"As discussed, unless I complete some important and recognizable activity in the next few years, ~~the~~ say by 1980's, my future could be seriously affected. ~~My~~ My age is

(748)

around 32 mm "

My concern expressed
in the covering note ~~comes~~ came
from the aggressive (and
mischievous) lobbying and
~~territory~~ territory grabbing
by Jai P. Singh (JPS) to
get control of INSAT, ESA,
communication etc. He would
not get into technical details
but try to grab papers and
put them in his notes to
show that he had control
over them. Whether SD
(or tolerate) encouraged such activity by
him, is not clear. He needed
his help for INSAT, as PPK

(749)

would ~~be~~ be unable to do it,
though he had been notionally
ear marked for INSAT-1

project. Or may be ~~the~~ SD
believed in "management by
conflict" which was also partly
the style of Vikram Sarabhai.

This JPS factor remained throughout
in my career in ISROHQ as
we ~~would~~ would see when I wrote
about later years.

But I did not let me
bog down. I took on the responsibilities
for the overall administration / face of
~~IS~~ of ISRO as A-SS and also
continued my specific ~~tasks~~ duties

~~75~~(750)

work on satellite, tracking etc. I read a lot about the future of space programmes around the world thanks to the immense public domain documents available through NASA. Even the Soviet ^{published} work in Russian was made available by NASA through their arrangement with Israel for Translation series. ~~(G)~~

Another important item I started giving attention was to the building up of Library ~~(which~~ (reading books, reports being my favourite right from 13 years, thanks ^{to} my uncle N. S. Iyer). ~~and~~ I ~~also did~~ was indirectly involved with

(751)

which helped me also tremendously.
Expand my knowledge in many
fields. In NASA, I & RMV and I
were regular visitors to the Library
— ordering free ^{NASA} reports and sending
to India. We had touched ~~at~~ upon it
in my write up on life in ~~NAS~~ USA /
NASA.

Here the Library ~~is~~ was
our own. Greatest help was
V. Siddhartha — in searching out
many sources (in days where
there was no search machine)

He was the "search machine" and
"dissemination machine". Many
persons in ISRO did not recognise

(752)

its value. They would make snide remarks that he was wasting his time. In fact, VS's covering slip would contain a cryptic customised comments for the receiver.

Another voracious reader was

S. Chandrasekhar who joined ISRO HQ as a young analyst (B.Tech ~~in~~ in Metallurgy from IIT Madras and ^{MBA} ~~IIM Cal~~

PG DMA (MBA) from IIM Cal).

We really started building up the ISRO HQ Library (~~at~~ our ~~the CB~~ office was in the

CBAB complex, also called Carvery Bhawan) in Kempegowda

(753)

Road, Bangalore. ~~I was~~ One side of the complex was just in the side of part 8 (about 7 floors) of the then ~~AI~~ Indian Airlines office — later ~~AI~~ Air India. Now @ 2016 it had moved out to the Unity Buildings; we used to go there also for lunch in the Kamat Hotel. The whole team of ISRO HQ (KSP, JPS, YSR, ~~ADR~~ Chandon et al ~~—~~ ~~SI~~ VS used to go home for lunch) would ~~not~~ go there. ~~We~~ Ordering ~~with~~ would be so chaotic! Eating different items. There was one management trainee Jayaraman with a remarkable

(754)

~~arithmetic~~ observational and
mental arithmetic computational
capability — who ~~will~~ would say
who is to pay what, for what
they ate. Bill would be one;
the chaotic ordering would
have made any server 'mad'
if he had to give individual
billing. Some persons occasionally
order more than they can eat.

KSP ~~will~~ would say "Pass it on!"
and eat. But he had well
streamlined body! No punch.

Normally we ~~are~~ used
to go to the Karmat canteen
(more a Janta type) within the

(755)

CBAB complex. With imposition of Emergency & one of the populist measures imposed all over India for all hotels was to give a janata meal, janata snack etc within a fixed price — a price almost impossible to meet, even by the South Indian, Udipi type hotels which really gave low price good quality items; they believed in low profit margin for each item but they had a large customer ~~base~~ base due to low price — high quality. That hotel suffered. But they managed

(756)

to have a segregated part of
the hotel hall for such
~~esse~~ Emergency Janata meals.

They had to cut corners in
terms of ^{cutting down} cleaning the rice from
small stones etc.!

We would go to the
non-Janata part!

Coming back to the library
KSP helped in overseeing the
library; classification. There was
a good librarian called Raghavendra
Rao - quiet, competent man. Once
during the ~~peak~~ peak of Emergency
there was a call to ~~my~~ ^{an} office
of Scientific Secy ISRO (in fact I inherited
the big office of PDB. But I sat in a

(757)

a smaller room making the big office
for my office persons - & common
files etc). It was from special
Police Intelligence office; ~~the~~ the
person who took it, I think Suresh
Rao was a little rattled and
asked me. (Thank God! I was
there & in the room) I took the
call. The officer ~~was~~ in the
other end told " Sir I am from
police intelligence. We want to
know about the political views
and activities of one Raghavendra
Rao working in ISRO Headquarters."
Knowing what such police officers
were(are) and the Emergency, I did
not want to enquire, why etc.

(758)

I told him: "He is ~~of~~ very quiet and ~~classical~~ is dedicated to the work. Almost whole day he will be in office, work and goes home after office closes. Excellent in his work!"

Officer: "Sir, any doubts about him; his political affiliation; etc."

My answer: "I have never seen him talking any politics, even as gossip. He is a quiet worker. I don't think he has any political views. I am ~~to~~ very

sure that he will not engage in any anti-national activity."

~~The~~ Officer asked a couple of

(759)

times more reframing the basic question. I assured him that

Raghavendra Rao ^{was} ~~to~~ a simple citizen and ~~the~~ the officer need not look into this any more.

I think, they ~~may~~ ^{might} have closed the file. This was in 1978! There were ~~several~~ a few other Emergency related items which were harsh; ~~the~~ how Vellodi, BPL, SD handled it, I will address ~~at~~ ^{at} another place of this 1970-80 write up.

Coming back to the library; it was built up assiduously. Lots of space ~~to~~ related matters, systems level more, programme level, avoided detail design related technical

(760)

book more relevant for Centre.

If we needed we could get through
inter-library loans. Also on
space-legal, geopolitical matter, US
Congressional records relevant to
Space; ^{US} GAO reports; NASA reports
etc. Also some general ones.

Later when I came to
ISRO in end 2009 (~~ea~~ from January 2010)
as Dr. Vikram Sarabhai Distinguished
Professor, I looked for them.
There was a capable, IT savvy
librarian Ashalata Narasaiyah.
I was informed that most of
them were lost in the three
floodings which took place
in the ISRO HQ new buildings!

(761)

I was sad to learn about those wonderful books, and also ~~the fact~~ to experience a fact ISRO HQ did not bother about ~~their~~ ~~building~~ designing the building properly. They knew that ~~the~~ the land ISRO got was a lake "filled up" during the ~~urbanisation~~ "urbanisation process".

Also they had all facilities of remote sensing, GIS etc in late 1980's which others did not have. So much for intra-organisational knowledge factor and the care for details. Though I was Scientific Secretary ISRO Hll 1988 (even when the building was planned), I had pulled myself

(762)

from it as Poyarkao preferred
his direct control of it with
Chief Engineer R. D. John, who
built most of ISRO building
starting from ~~Thud~~ Thumba!

It is really surprising that
he missed this flooding
possibility (high probability!!)

Later once D. Lal
visited ISRO Library during ~~1976~~
1977 I guess. He ~~had~~ asked
me: "How you guys in
~~the~~ HQ keep in touch with
science and technology and not
just be file-pushers".

I made him go through
my office, the reports there and

(763)

and also ISRO HQ Library.

He ~~went~~ spent an hour or so.

He said "Rajan maan gaya."

He was delighted to see
our knowledge sources. Not
all read though! I benefited
a lot; so was a few others
like Chandea.

* * *

After this diversion into some
interesting aspects of our life in
ISRO HQ, let us come back
to the floor of ~~the floor~~ ^{are} my
activities in communicating with
ISRO higher management on ISRO
programme. Though I had
expressed concern ~~in~~ early Feb 1976

(964)

about my career trajectory, as we saw a few pages ~~earlier~~, I was on the job on reminding SD on detailed actions.

Since now I was ASS, ISRO (de facto) doing ~~all~~ almost all the ~~role~~ ^{tasks} of SS, ISRO, I took it upon myself in directly contacting ISRO Council members.

I was not waiting for routing them through Chairman, ISRO; I had a direct, frank and detailed ~~channel~~ ^{channel} with contact with him almost on a daily basis and writing detailed notes often.

~~ISRO Council~~ I was not meeting ISRO Council members that ~~of~~

(P.T.O)

(remote sensing) from 1984 to 1988. He was and is an examiner for Ph.D thesis for a number of universities.

He is a multifaceted person and has authored several books, literary works and poetry in Tamil and English. He also plays an important role in interfaith dialogue such as Surat Spiritual Declaration Oct 2004 and its follow up actions.

Positions currently held

Positions held earlier

Awards and Fellowships

(765)

designed and maintained by **MINVELI INFOTECH**

For any queries please contact pdhanapal@yahoo.com

often. UR Rao was still with an ISRO Council member, as he was with a Centre Director. ~~He~~ My

recollection is that TNS had to be sent off to the main IAS cadre, after serving Dept of Space, coming from DAE from 1972-75

He had helped to DOS, ISRO to transition to Govt, learn to work with ~~needlessly~~ without "needlessly inelastic rules".

I had marked a note to the ISRO Council members. ~~CONFIDENTIAL~~ ISRO internal

(766)

Use Only. To be opened by the addressee."

Addressed to Prof. S. Dhawan,
cc to Dr. Brahm Prakash,
Prof. Yash Pal, Mr. Vellodi,
and Prof. D. Lal. ~~File~~ File Ref.

Long Term Plan. ~~date~~ ~~24~~

27 Feb 1976.

sub: Some Important
additional activities for ISRO
to be initiated in the next
6 to 12 months. (I am
attaching a copy of the full note
as it is somewhat special).

It starts off

"Please excuse me for
arrogating myself the role of a

(787)

~~Goal fixer~~ Goal - Fixer. Amid the daily chores, one feels better and youthful, thinking about the long path before us.

--- we need to think of ~~it~~
near future - 5 years from now;
thoughts about future need to
be with us, I believe, in order
not to ~~lose~~ lose perspective. These
items are not too far away;
we have to initiate work in the next
6 to 12 months! Hence this note to you."

- It calls ~~for~~ for three actions
- (1) Launch of a three-axis stabilised near earth orbit satellite
 - (2) An SLV variant ~~to~~ with 300-400kg satellite in polar orbit and
 - (3) Establishment of a polar range...

(768)

Some brief description and time
schedules. etc.

Ends para:

" May I take the liberty to suggest
that the higher management should
shed the ~~the~~ timidity presently
shown towards long term planning,
and boldly announce our goals? - ...
"

Copy of the three page is
attached as a flowij text
in the next pages.

R.T.O. →

HEADQUARTERS

CONFIDENTIAL

MEMORANDUM

ISRO Internal Use Only
To be opened by the
addressee.

For: ✓ Prof. S. Dhawan

cc: Dr. Brahm Prakash
Prof. Yash Pal
Mr. Vellodi
Prof. D. Lal

File / Ref: Longterm Plan

From: Y. S. Rajan

Date: 27 February 1976

Subject: Some important additional activities for ISRO to be initiated
in the next 6 to 12 months.

1.0 Please excuse me for arrogating myself the role of a Goal-fixer. Amid the daily chores, one feels better and youthful, thinking about the long path before us. With the launch of Aryabhata & conduct of SITE we have just proved that we are alive to kick forward the technological frontiers of the country. STEP, SEO, SLV-3 & RS-1 will be completed successfully - an incorrigible optimist I am. Similarly, I am convinced that APPLE and INSAT-1 are round the corner, making further steps towards the GOAL. We need lots of hardwork, attention to details, better system of running projects etc, for which I will keep addressing you at various times. But still I am convinced that SUCCESS IS OURS. Hence, at least in a rudimentary way, we need to think of near future - 5 years from now; thoughts about future need to be with us, I believe, in order not to lose perspective. These items are not too far away; we have to initiate work in the next 6 to 12 months! Hence this note to you.

2.0 At various instances I have sent analytical notes to you justifying various programmes relating to SLV variants, light weight satellites etc. Hence I only sum up the activities here. I believe, that in order for ISRO to fructify to an "operational" level the following three activities are to be completed as a minimum :

- 1) Launching of a three-axis stabilised near earth (or synchronous) orbit satellite of pointing accuracy better than 0.5° either by indigenous launch or more realistically a foreign launch. This is a must for any operational earth observations system or for good space science experiments.
- 2) A SLV variant that can place around 300 to 400 Kg satellite in a polar orbit of about 500 km.

and
- 3) Establishment of a polar range for the country.

3.0 The three items mentioned above carry in them many activities: Liquid propellant work, expansion of solid propellant work, improved test standards, increase (or improved) test facilities, better "avionics", ground tracking network, ground stations, and so on. When these three projects are fixed, these details will come up for action. Besides APPLE (or equivalent) and INSAT-1 which are round the corner, these three projects should be completed before next 6 to 7 years. This is a very realistic time frame taking into account all the trials & tribulations of SLV, budgetary constraints & so on. I have deliberately left out SLV-SYN and shuttle related works as these can be completed only in 10-12 years from now.

4.0 Completion of the present ongoing works and the above three activities will just put us in the 60% point of achievement curve. The 40% beyond that

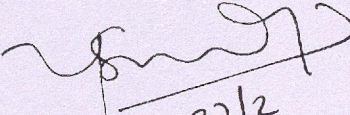
(771)

-3-

point will require lots of attention to details, perspiration and honesty, as in that 40% lies the achievement of reliability, confidence levels and perfecting operationality; and the curve will be asymptotic towards 100% and hence slow. But without reaching the 60% point of the curve, the expenditure done so far may turn out to be largely infructuous (if I may use this strong word) except for some spin-offs from high technology activities & high quality brains. But let it be noted that good brains will atrophy without challenging work.

5.0 May I take the liberty to suggest that the higher management should shed the timidity presently shown towards long term planning, and boldly announce our goals? In the oscillatory cycle of management tactics (or strategy?) between romanticism (for creation) and conservatism (for execution and consolidation), I feel, we have touched the bottom-most of romanticism and adventurism, and it is time we launch ourselves into the upswing of romanticism and adventurism. (I do not mean going haywire!).

6.0 Thank you for your time. Regards.


27/2

769

770

771

27 Feb
1976 notes

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Another remarkable note from me dated 16-3-76 from me, all handwritten.

It reminds about ~~the~~ the nearing of the end of term of Dr BP - some 4 to 5 months away: The need for extension or alternate ek. I had used ~~the~~^a ~~to~~ coined word:

"step - unput"

~~PBT~~ PDB, TNS & MAV

Jone (step - unput)

now BP, coming near ek

This note is also ~~also~~ attached as a running text in the next page. These are examples of the liberty, I took or I was allowed to take! How much I felt that it was my duty!!

(773)

16.3.76

To be opened by the addressee only

Prof. S. Dhawan

I feel it is my duty to remind you — just remind — about one important "step - input" we may have in a few months i.e. Dr. Brahm Prakash. We are still going thru the adjustment phase of three "step - ~~inputs~~" at HQ. (PDB, TNS and MAV). May be we could have done something earlier to solve these.

But Dr. BP's departure or stay for a few more years has much greater impact. I understand from Mr. Vellodi that Dr. BP may stay on with us for additional three ~~more~~ years provided he can take off 3 months in a year for teaching etc. This should be possible if we can have a good deputy.

Finding the deputy, discussing with Dr. BP and doing the paper work for extension etc are Chairman's job. Time is short now. I will send another reminder after 3 or 4 months without even asking whether you have taken action. (I need not know); but I think I need to remind. Regards.

Rajan/16/3/76

77/3
16-3-76
Handwritten
msb

(774)

~~Am~~ My mind was very fertile during ~~197~~ those periods especially after Aryabhata launch. ~~Since~~ I had the good fortune of discussing with PMSD on various aspects of life, geopolitics in an elevated level, science, philosophy etc, other the routine items of ISRO. ~~So~~ So sometimes we discuss about the growth of 'real science' in India; some really fundamental thinking about scientific aspects.

While various events in my life have made me ~~to~~ a top level executive staff of ISRO and an active manager, I had

(775)

a great desire to do theoretical physics, or do fundamental research in the classical (romantic?) sense of the 1930's. Maybe it was an impossible dream. Even in HQ, amid all other work, I read a lot of material from NASA on space sciences, articulation of potentially ~~an~~ good area of research in still unsolved issues etc. But it was difficult to discuss with others in ISRO.

I found a note from me to B Prys Shawan dated 28 April 1976

"Growth of analytical talents within ISRO"

It is a remarkably blunt note, pouring out my angst

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about lack of original thinkers
of ~~with~~ in ISRO including PRL

The trigger to write the note

had come from a meeting on 25 April 1976
The note also is about the names of the persons who
successfully run ISRO.

⊗ This problem pricked me very

severely on 25th April when we had

⊗ the Programme Board meeting for
Sponsored Research¹⁾

This programme is called
RESPOND, specially created by
PrgSD to fund research in Universities
~~on~~ broadly on matters concerning
research in activities related to
Space. SD & I had a lot of faith
in it... But alas! it had very
little of original proposals.

Now @ 2017, when I returned
to Bangalore @ 2010, RESPOND is
so pathetic! The 25th April 1976 note is attached.

(777)

Prof S Dhawan

S.1

Y S Rajan

28 Apr 1976

Growth of analytical talents within ISRO.

- 1.0 I have been thinking on this topic for a long time - almost as early as 1964. The way in which ISRO has to operate to deliver goods in time, has always tended to foster administrators, managers or pushy "fixers" even in the Space Sciences! These persons, no doubt, have their role to play in establishing Science & Technology in the country. But a viable system which can stand the test of time and a system that can become self-generating, can never come out of such swash-buckling individuals. One needs thinkers - persons for whom scientific thinking has become a way of life.
- 2.0 In spite of the enormous indigenisation that has taken place in Space Research in India, it can still not become self-generating, because our basic thinking and inspiration is drawn from the outside world - from NASA, ESA etc. Not that I want us to close our eyes to outside developments. I wish to stress the fact that our science - our analytical framework - for Space Research in India is essentially a transplanted limb into the Indian society. Persons like Tsiolovsky and other scientists (both experimental and theoretical) are the ones who produced an original designer like Koryolev. Today we find the mark of originality in all the Soviet designs. The enormous experimental and theoretical base of the USA need not be stressed again. I need not point out to you similar developments in the field of Aeronautics.
- 3.0 Considering the above factors, what is ISRO doing to produce such a solid base of scientists? The fact that we are better than DRDO or HAL should hardly be a consolation for us. This problem pricked me very severely on 25th April when we had the Program Board meeting for Sponsored Research.
- 4.0 Besides posing problems to you, I always feel, I should offer solutions. (I also believe they are reasonably good ones!) The way the ISRO management - Chairman, ISRO, his headquarters, the Directors and the Project Directors - is constantly fire fighting, none of the ISRO Centres/Projects can manage the

.....more

delicate job of handling creative scientists; the mainstream of ISRO is too turbulent for calm thinking. PRL could have filled up this role; but it has become an intellectual carcass. Hence it is high time, Chairman considers setting an 'ISRO Institute of Fundamental & Analytical Research' headed by a high calibre scientist. Prof R Narasimha or Dr Ramaseshan could be the Director of such a Centre.

- 4.1 Director of this Institute should have lot of autonomy in personnel management. He should have equal, perhaps, higher ranking than the Centre Directors but should not be a member of ISRO Council and the rest which can kill his time. But a management system should be worked out to send important Project Proposals to the Space Commission through this Institute. May be he could be made a Member, Space Commission to give him clout and status. This Institute should have about 50 to 100 high calibre scientists (visiting scientists etc.)
- 4.3 A simple mandate for this Institute should be to produce high quality advanced research in Astronautics, Avionics and the Space Sciences. When it is fully grown it will not cost ISRO more than Rs 2 to 3 crores per annum.
- 5.0 If Chairman feels that this is a worthwhile and workable idea he should start activities on generating this Institute as soon as possible because it will take at least two years to settle down; Chairman, should personally give shape to this, if he is convinced of this idea.

Regards.

(979)

I don't recall any substantive discussion by SD on the topic. I had suggested creation of a special institution with specific protection from the whirl-winds of ISRO.

SD probably had too many things in his hand.

Or perhaps seeing the way

ITSc was, he ~~was~~ might not have had hopes of creating a new institution.

I had suggested that ~~the~~ creation when SD was very much in para. His 60 years

was ~~in 1980~~ going to occur

in 1980's. As I had pointed

out, ~~for~~ any thing new started

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in India ~~it~~ would take at least 2 years to settle down. Still it would have about two more years to start functioning under SD's chairmanship ~~to~~ (which might come to an end in Sept 1980).

We I ~~it~~ was not ashamed of suggestion. Let me try as I had an opportunity: if ~~it~~ something ~~concrete~~ concrete emerged, I ~~am~~ ^{will be} happy.

I was looking for any direct personal benefit for myself.

Probably because of that SD never curtailed me from sending notes to him.

As far as my regular work ~~is~~ was concerned, they would

(781)

be 100 or 1000 times more than writing such note. My job as ASS and also a regular staff - programme - manager/analyst in ISRO took away bulk of my time. In addition I had my own method of harmonising many things within ISRO HQ scientists / administrative persons / DOS staff & officers and also in terms of interfacing with Director's of Centres, senior staff in Centres, middle level persons etc. ~~A~~ Looking back I wonder how I was able to cope up with all those things. These notes to SD

(782)

~~had~~ were often a result of some of brief discussions I had with SD. My meetings with him were almost on a daily basis, some for routine clearance of files, some on various "meandering discussions".

I still remember what ~~the~~ SD's long-term Personal Secretary (PS) used to tell me:

"Rajan Sir, when you go inside Chairman's room, we can't control time. ~~There~~ There are so many meetings line up now, can you please tell me how much time you will take?"

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~~With David~~

David & I would often talk in Tamil too.

"David, you know your boss well. I can finish all these ~~the~~ files, papers, I can carry in 10-15 minutes. That is the maximum I need.

But I can't control our boss.

If he starts on some thing else and continue, what

can I do? I ~~don't~~ can't

guarantee that time. If you

want to pull me out,

you come in and tell the boss"

These were friendly exchanges, we used to have.

(784)

He uses to tell others
who seek Chairman's time.

"Rajan Sir is just going to
go inside. I don't know whether
it will be 10 mins, ~~or~~ 1 hour!"⁺
If he comes out, I will let
you know!"

That is the type of
opportunity I had; ^{the}
privilege that was given to
me by SD. Those general
discussions with him had
enriched my life. ~~Some~~ During
some of the discussions, I
had also expressed my
aspirations for career briefly
and saying I will elaborate in a note.

(785)

~~Also~~ These notes would often ~~had~~ be having ~~in the~~ threads in my regular talks with SD.

I should also state here that my notes to Proj SD were very many ~~or~~ - ~~litera~~ more than a hundred in a month. They were all on regular office matters for information, approval etc. Hopefully they are all available in the archive files of ISRO. I don't have copies.

~~I should~~
What I wrote to him confidential / personal would have

(786)

been only ~~a~~ one or two in a month.
I ~~also~~ did not keep ~~a~~ copies
of them either. I was fortunate
to have them with me, because
(as I had mentioned earlier)

SD chose to keep them safely
with me, ~~and return~~ almost
a full bag (a thick Russian office type
Bag), carefully kept papers
during ^{of the month} end 2 Sept 1984

"Rajan! I had kept all
the notes ~~I sent~~ you sent
to me! You want me to send
to ISRO files? I will ~~sign~~
initial & send it. Or
you want to keep them, I
will give this bag to you; keep

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them as you want!"

"Sir thanks! I don't have copies of them with me.

But all the typed notes ~~was~~ including ~~Personal~~ Personal/Confidential ones will be in the ISRO files, Scientific Secy ISRO office. So ISRO will have its copy. I will keep these!"

I was fortunate to have them so that, I can refer and refresh my memory while writing.

Now a digression to describe about the files & in ISRO HQ and especially Scientific

(788)

Secretary, ISRO office. When
P. J. P. D. B. was Scientific Secretary, ISRO
he was ~~operating~~ operating almost
each activity as a file! Only
person who had the memory
to access was Achutan
his trusted PS. All of us
who were inducted into ISRO HQ
had our own files & filing
system.

Some of us especially
Siddhartha realised the need
for a codified filing system
for the whole of ISRO HQ.
We all discussed and entrusted
the job of creating a single
system of ~~the~~ File Numbering to

(789)

Dr. KSP. All scientists were at
one that. Except for JPS all
others used the system very well.
One copy will go to SS's office.
Even if it did not, one can
~~take~~ track the file from the
numbering system. Suppose ~~then~~ the
matter pertains to "International
Cooperation". It would have
a Roman number code: then ~~for~~
~~country~~ number signifying
the country - then sub numbers
for agency etc. The numbering
system allowed ~~open~~ for
opening of new areas as
well. It ~~was~~ worked ~~to~~ very

- ~~78~~(790)

for easy access. Except for
the files which were Secret /
Personal / ~~Strictly~~ Confidential
all the files at SS's office
can be accessed by any
Scientist at ISRO HQ going
to ~~I~~ SS's office.

Among the papers
returned ~~for~~ by Proj SD,
there is a ~~file~~ file with carefully
handwritten notes - Green
Ink ~~and~~ with Red Ink ~~but~~ for
high lighting some portions.
The note is dated 27 May 1976.
Even the master file clip
is intact now!

(191)

* *

Before proceeding further I should specially thank the thick Russian Bag which ~~for~~ Prof SD gave me. It was the protector of the notes. When I went to New Delhi, it was ~~the~~ stored in the garage of the ~~at~~ Govt apartment in Kidwai Nagar where we stayed. ~~All~~ All ~~the~~ of them being old and poorly maintained termites ~~had~~ occasionally ~~to~~ visit them. Since fortunately Goma & I visit it (it was not convenient to keep our car there, as the allotted garage was ~~for~~ quite a distance

(792)

away from our apartment. It was convenient for Gonna to park ~~the~~ ^{our} car ~~in~~ ^{at} the back of our apartment. It was a prized possession Maruti 800! (Special quota for those in Additional Secretary rank in Govt.); all other have to wait in queue for several months!

~~By~~ Some of my ~~the~~ ~~act~~ collection of books and reports, I had were eaten away by termites. But the Russian bag protects this papers. ~~Their~~ att Termites' attempt to attack the ~~#~~ bag

(793)

was not successful. But I could see the traces of their attempts! Thank God for the bag!

* * *

Continuous struggles within ISRO and several petty policies had often made me think of "an escape from it all"; I ~~had~~ especially after I returned from USA (1974 plus....). I had also ~~not~~ noticed by that time how other organisations like DRDO, NAL, HAL, & IISc etc function! ISRO was far better. That was the assessment of those who were outside ISRO (but they were not aware of

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internal ISRO ~~to~~ conflicts!)

Those months from
1974 to 1976 beginning had
matured me to understand
about life. I came across
a beautiful quote from Rabindranath
Tagore and had kept a
types copy a part of it ~~in~~
under my ~~table~~ table-glass.

It reads:

" Deliverance? Where is this
Deliverance to be found?

Our Master himself has joyfully,
Taken upon him the bonds of creation;
He is bound with us all for ever"

— Gitanjali

(795)

The note starts with a PERSONAL NOTE, & thanking SD "for the confidence he keeps in me and shaping me towards

towards maturity in the past two years thus enabling me to overcome the traditional ISRO MALAISE of insecurity "

It has 24 pages - but with lots of gaps in sentences (many sentences in CAPITAL letters)

Then a list of MAJOR ACTIVITIES OF ISRO IN THE COMING DECADE

There are eleven bullets under this heading. When I read them now, I am surprised ~~that~~ ~~the~~ to note that it ^{was} so comprehensive and forward looking and clear.

76 (796)

Fourth bullet: (all in CAPS)

" Prepare grounds for Defence utilisation of Space for Recon, Communication and offensive missiles "

Sixth bullet

" Establish a good space tracking network (may not yet be fully capable in reaction time of few minutes required for offensive missiles intervention "

Last bullet:

" Introduce some subtle but important elements in the NATIONAL SCIENCE AND TECHNOLOGY (through

(797)

~~the~~ Through industrial interfaces,
subcontractors, interface
with other agencies, and
good offices of Chairman)
(Sub-elements are listed)

All other items are strongly
ISRO oriented: new short term,
medium term & near term.

Then the note addresses

" IMPORTANT MILESTONES FOR
ISRO (SPACE ACTIVITIES IN
INDIA) "

Starts from

1976 - Projectile APPLE

1977 - Sign Procurement contract
for INSAT-1

etc

(Specific items

1978 has an item:

- Dr BP may leave us(?)

(798)

1981-86

- Setting down of NEW
Chairman

--

--

- Some guided missiles tests

St,

--

--

Then it ends:

1976-82 is very critical
for Space in India.

Then the note addresses

Role of ISRO HQ

Immediate and specific items

(~~the~~ members organisational
elements too)

The ^{mtg} goes SCIENTIFIC SECRETARY'S ROLE
In a UN style

Taking into account the
existing ISRO personnel
etc.

(799)

It is a fairly good description
of SS's role

Then the note goes
towards my own ~~pos~~ position
vis-a-vis the earlier mentioned
items (p. 13 onwards)

"My role as "Scientific Secretary"
Personal view point"

Then I list possible roles for
me:

INSAT-1 Procurement Manager

"Though Chairman did not
mention this, I feel this is
a role I can fulfil effectively"

--- my fit for the job as well as,
I had given the plus & minus
of these steps for my career & ISRO.
After describing these
possibility there is a table

(800)

at p. 22 of the note & cover p

22, 23 & 24 (it ends there)

"MY PREFERENCES (IN ORDER OF PRIORITY)"
The table has three columns

JOB	ADVANTAGE	DISADVANTAGE
Blue ink	Green ink	Red ink

I had placed "Scientific Secretary ISRO"
as p Priority-1, and has the longest
list of Disadvantages (also Advantages)

That note would have
clarified matters to myself
and perhaps a clear writing of
ISRO programmes, critical
issues, some national contributions
beyond ISRO, as an input was
available with SD.

All what I had written