

(201)
importance of Medicare! Now I
have more data; problems of
ageing some of which can
be irreversible! A rational
person with blinkers!! It ~~was~~ was
^{Life}~~life~~ which was to widen
the blinkers!

Though I did not
Perianna (I know that
I could not because Perianna
was firm on some matters and
she had no duty to perform
things such as taking care
of Periappa) stop Perianna,
I was not very happy because
I looked at limited parameters

Invert
in p. 202

202(a)

A small but notable
observation in American people's
view point occurred after
immediately after end December 1971.

Whenever I went to market
~~or off~~ ^{or other public places}
places ~~especially~~ especially in
lyts, ~~when people who~~ people
usually ignored our presence, rightly.

But quite a few of them
started asking ⁱⁿ after ^{Dec 7th}, 1971,

"Are you from India?" When

I say "Yes", there was some

~~this~~ brightness in their faces.

"Very Good! India has done
very well with Bangladesh!"

American people in general
appeared to have expression of
"power" and success.

*-A *

→

As of 202)

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like her living standards.

Again this issue faded into the background, as I got immersed into the NASA work.



work.

202(a)

*

*

*

Hard ware development ~~was~~ for ATS-F satellite was moving on at a rapid pace.

Subsystems were getting ready at various work centres. Therefore the entire focus shifted from

specification finalisation for

various subsystems when the work enters Phase 1) when we

joined NASA drop out 1970, ~~had shifted~~ to writing of

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Test Plan & Test Procedures.
Draft had started during 1971
itself. Serious work for finalisation
took place during 1972. Actually
documentation of the overall
test plan was lagging behind
the ~~entire~~ detailed ~~&~~ test
procedures of ~~most~~ individual
subsystems and assemblies.
Actually, in theory, ^{detailed} procedures
had to follow an approved
Test Plan. But realities of
schedules were knocking at
the doors! The work was
going on parallelly; we (from
the project team) started giving

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inputs to the Fairchild, the prime contractors and ~~to~~ directly to the ^{sub-}Subsystem Contractors, ~~the~~ our areas of concern, so that time was not wasted on qui as these differences later, as tests were time consuming. Some ~~the~~ times the measuring instruments would be questionable ~~due~~ due to their sensi measuring ranges, sensitivity etc. Lots of detailed practical knowledge & was required. I was particularly good where there were radi frequency ^{microwave} systems were ~~are~~ involved. The ATIS-F Satellite had many of them.

I used to bring carton loads of such test procedures / test

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test plans some times as many
of them would have just
arrived. I used to correct
in the pages itself or give
my comment / critique on pages
themselves and give them
to Bernie as all electrical
systems came under him.
Some time he would tell me
to give to subsystem - engineer -
in-charge in the ^{NASA} Project office or
even directly to the companies
(sub-contractors / Prime contractor)
etc. My comments were
respected as ~~it~~ ^{they} had the
backing of Bernie / ^{Tony} Sabelhaus
and also often they were very good

(205)

technically. Often times,
I had to visit the laboratory
concerned. I used to go ^{to} _{to} the
Fairchild office which was
about 40 miles away by driving
myself. So I had to travel
to Palo Alto ~~to~~ going to
San Francisco where ^{then} Philco Ford
was building the transponders.
~~Some~~ On some days ~~at~~ the
~~was~~ stay was for a longer
period (3 or 4 days). & A few
NASA members used to be
there also. I recall that

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we had gone to Fisherman
Wharf and had eaten
King Lobsters. When I
got time, I had done
some site-seeing going
to San Francisco in cable cars;
Red wood forests. It was
relatively inexpensive as I
could have a Rent-a-car
and was to take the smallest
one, as its rent was the least.
These expenses were ~~the~~ official
^{to be} paid for by ISRO) but it
was not available to us as
dollars, as it was difficult
for ISRO to pay us Foreign Exchange
other than what had been allowed.

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Therefore we had to spend from our pockets and keep accounts which were settled by ISRO in rupees later.

How well I ~~do~~ did and claimed I am not sure. I was very poor in such matters. I learnt later when I came back to India in end-NOV 1973 and ~~the~~ ~~ISS~~ joined ISRO HQ in 1974 as by then there was a proper system in which ISRO ~~with~~ would buy tickets; give allowances etc, as in govt. In my stay in USA, I might have lost money ~~to~~ by spending to ISRO. But in the overall, ~~to~~ Goma & I were balancing our incomes and expenditure.

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I was also a good
^{amateur}
L photographer. I had a proud
possession of Olympus 25(?) E.
I have the camera even now,
bought for ~~2~~ \$125/- a
lot of money for us. I used
to buy colour films. When Uma,
Vijay & I went for short picnics
near by (starting morning and
~~go~~ returning at night - one
way morning drive by Uma &
return night drive by me), we
had taken lots of photographs.
We did this morning - night
return ~~out~~ to avoid the

(200)

expenses on the night stay. That
also restricted as to how
far we could go.

Mostly we were restricted
to the places of historical
(500 years) interest to Americans
~~one~~ in and around our
house. Some days we tried
to go to Washington D.C. to
see the memorials, cherry
blossom etc.

I felt a little
bad that I could not take
home during my trips to
California (San Francisco,
Palo Alto etc) because

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the plane fare & stay costs for three of us ~~would be~~ was very high.

Only once ~~at~~ towards the end of my stays when I had to go the launch range for official visit, I took Goma & Vijay by Amtrak train to Florida by cutting down travel fare. Goma took Vijay to Disney Land, I could not go as I had official work to do. We could not stay more as stay costs would have been more. I had to take such constraints

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as a part of the "rational" and "pragmatic" decisions. Goma also did not ask for, anything more. She was a good controller of home finances and she knew our constraints. As for the general advice of Periappa, I had kept some reserve dollar always available as we had a child and we might need it in case the insurance ~~does~~ did not meet some cases of sickness. We were lucky, we did not face any such crises.

We enjoyed whatever we could do without cribbing

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for what we could not afford!
Goma's role was a great
support for me in such a
living. That was so all
through our lives. Even
when I travelled on ISRO/
~~therefore~~
host expenses later many
times abroad (1974 - 1997 or
~~later~~) I could not take
Goma with me, partly due to
the need to take care of
children and partly due to
cost reasons, as my salary
was limited. Therefore when
Goma could go to many
parts of ~~the world~~ Europe
in 1997 and later from 1998

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~~for~~ for being with Vijay, I was very happy. Vijay had made his Mom (Uma) to see and enjoy many places which I had not seen at all though I had been to USA many times, as I was restricting my expenses.

One interesting side-ty about the flights to San Francisco. One airlines I think TWA gave a free partner tickets ~~for~~ for those who buy their tickets. A number of persons (I don't recall ^{from my} NASA group) had availed of it. I

2165)
did not, as I have to buy
one for Vijay or to get a
proper care for him, which
was not easy. Later it
appears when TWA took
customer feedback 6 months
or so later, it caused
many divorces! The partner
taken ~~was~~ were different
and there were not the days
of individual personal mobile
phones. Home phones ~~was~~ ^{were}
received by wives!

I had not seen
Shenoy or Narayanan doing
such travels as their roles

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were limited to what Kale assigned them.

The visits to the space & labs in companies was a great ~~exp~~ learning experience for me. They were very advanced compared to what we had then in ISRO (Later in ISRO since 1975+, we had ~~had~~ much better equipped labs and now from 2000+ world class facilities)

~~Dr~~ Bill Redisch was an interesting systems ~~exp~~ engineer, but more familiar with control systems and launch vehicle interfaces.

So whenever But he was the Chief Systems Engineer

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having a high status. He could
ask any sub-system to explain
to him. He had some independent
role but ~~the way~~ I had
not seen ~~at~~ him under cutrip
the R Satellite Manager (Tony)
or Project Manager (John Thote).
He ~~did~~ not usually get into
test plans / test procedures, except
for broadly ~~the~~ checking whether
they had been finalised.

For telemetry & telecommands
it was with one Al Blum, had
a small ~~beard~~ beard. He
was probably one of those 'left'
protestors to Vietnam war etc.
Not sure whether he smoked
'marijuana' before or even
when ~~we~~ were together. He uses

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to look ~~and~~ dull and somewhat sleepy; otherwise well shaped and strong. Bernie used to joke about him. He was a regular NASA employee. Al used to tell me that he did not understand any thing at all about these test plans / procedures and told me to help out. I used to help him with my notes. Some times it was difficult to make him understand. But ~~at~~ he was a pleasant person and we used to discuss ~~a~~ about many aspects of life.

He appeared to be disillusioned with the way US society was going. Too much

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of rat race. "Of what use, these are all?", used to be his questions. He did not have any alternatives, except that people should slow down and enjoy life a little bit. He was definitely not a Marxist ~~or~~ or other ~~for~~ forms of left asking for public ownership. He did not have an economic model but a social and individual questions. I used to reply to him ~~on~~ on some questions. I was not ~~to~~ even mentioning any things of Marx or communism. I found them ^[all the more] irrelevant after seeing the context of USA. After all the basis of communism and

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Marxian thoughts are materialist-
philosophy. Enjoying good things of
material life by all should be not
just an ideal but should be
achieved in practice. My belief
was that ^{modern} science & technology had
made it possible and I wanted
such an achievement in India. That
was one of the major reasons of
my devoting all my energies ~~to~~ to
the work of the Indian Space Programme.
Its potential benefits were not just
an empty talk of Sarabhai. ~~From~~ There

~~had solid~~ were solid reasons
& clearly seen
why it was possible. In fact, I clearly

"I saw" that

↳ the SITE experiment precursor

to INSAT will have great benefits

of reaching all people of India

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and helps the process of lifting
~~the~~ Indians out of poverty. My
biggest problem back ^{when was} in India ~~was~~ was
that the communists and left parties
were not even having ~~the~~ applications
of S & T as an agenda for ~~instruments~~
of growth. In fact they were more
of like Luddites and believed only
in their agitabars!

America, as I saw, ~~when~~
was a great example of using S & T
as an instrument of giving material
prosperity to people. The "poor" in
America were not as given in
~~the~~ the left literature in India.
I had seen their ghettos where
I was afraid to stay. But the
problem was not in terms of
daily food. I was seeing forward
movement of progress in the
lives of black ~~peop~~ Americans

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who lived in those ghettos. My position was not ~~that~~ that everything America did was right; Vietnam was wrong; their support to Pakistan which damaged India's growth due to constant war-like situations was bad; much of their geopolitics did not have my "approval". But it was not due to the modern science and technology, which was mostly the target in Al Blum's narrations.

"Rajan why should people rush in aeroplanes. Air travel is such a pain! Adds to tension! Why to run around so fast. You people in India are trying to copy these models. You will be after rockets and satellites! In the end, won't it

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help? What is the use of all these so-called modern progress?"

I used to tell him "Al: ~~for~~ You have enjoyed all these things and then at your age you are telling that they are useless. A person who has never travelled by air plane would be thrilled by his/her first flight. You want to deny them that! Also human being desire things in life. Is it wrong? Above all you cannot even imagine the economic backwardness and poverty prevalent in India. Our

Our ancestors were great persons and they did create lots of material wealth in ~~addition~~ addition

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to other great achievements in civilisation and culture. But lots of foreign invasions / occupations had ~~left~~ led to ~~their~~ slow down,

stagnation and considerable decay in many parts of our society. ~~I cannot~~ I have seen it. The solutions for changing those ~~conditions~~ conditions towards better world need many the modern developments which ~~are~~ have been done in America.

It will require S&T and many other modern production methods. A slow sleepy life looks at "romantically" from outside ~~it~~ does not fit for India. We need to run

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now and catch with developed nations. Hopefully what we do with ATS-F/SITE and other items of the Indian Space Programme are also a vital component for extending benefits of modern life to Indian people. That is what is my source of inspiration.

I would also add ~~that~~ that America also needs many of these continuing progress. If you look at them little more dispassionately, you will see the good things in them...!"

I ~~was~~ knew that Al ~~may~~ might not get convinced

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by my arguments. He was entirely
in a different world. But he
had faith in my ~~sincer~~ sincerity.

~~and~~ We used to discuss
other such things in our spare

time. Our friendship extended

to family also. Gomma & I & Vijay

had been to Al's home and

enjoyed an evening with Al and

wife as well. Gomma liked them.

I was not able to be in

touch with Al Blum after

our return. 1970's were not

the era of facebook or LinkedIn

or even e-mail, even in USA.

India - USA link was only

letters. I had too many pressure

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on my time. Looking back I feel
Dad that I had not been able
to keep my ~~to~~ contacts with the
wonderful persons of MIT / Lincoln Lab
and NASA with ~~whom~~ whom I worked
closely and had wonderful
professional and personal relations.
But that memory is still alive
in me! ~~the~~

Another one person was
Gill Bullock. His technical role
was limited. He was in charge of
the documentation in the project. He
his wife and wonderful daughters
(five I think) were good friends
of our family. He would have
been 50+ much elder to me & Lina.
One of his daughter was around
15 ~~at~~ or so. They were of Spanish

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Origin. Very fair skin but hair as black as that of Indians; dark blue eyes. Gona was particularly fond of their family. The mother of the girls used to say that though she got two ^{set of} twins continuously, the ~~air~~ raising up the four of them (two each at a time) was much more easy than the last one born alone. She said that when she had twins the two balanced each other, were their own playmates, etc. That family showed us the simple and tender part of American life. (at least as of 1970's).

One other ~~for~~ funny and in some ways painful episode was when the Indian ^{SITE} ~~trans~~ visited NASA. Chitnis used to come; but

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But this time it had all the
division heads from Ahmedabad. NASA
officers (Greg, Tony etc) had enjoyed
the warm hospitality of Indians
when they came for discussions. Unfortunately
the US Govt laws ~~are~~ were very
~~strict~~ strict and giving ^{official} parties
and hospitality were very restricted.

(NASA persons)
They ~~used~~ ^{used} to feel bad about it.

So ~~one~~ once they arranged a
small party with their own
personal expenses. Some liquor also
was served. NASA persons had
also invited the personal staff
Susi also. She used to take
care of all our typing work
(in addition to her primary
job of ~~a~~ doing secretarial

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work of Anthony Sabell^o & He
& John Thule were the only two
managers who ~~were~~ had this
privilege of personal staff.

Others have to write by hand.
and for very essential cases get
it typed by Susie. She was
good looking and friendly
person. She was a divorcee
at that time.

One of the senior
Indians after a few drinks
started misbehaving with Susie,
trying to go to her and hug
her. I was not present
in that party. Later (next day)
Susie told me this and
named the person. "I won't

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have slapped them and there and
throws him out. But I have
a ~~def~~ deep respect for all
of you Indians here and those
others who visit some time. Therefore
I avoided it; wriggled out of
him." The person she names
was also rumored to be after
his women colleagues ~~is~~ (often
young ones) in Ahmedabad as well.
Well what to do? I had to
hang my head in shame!

The person who ~~is~~ was
very affectionate to us was
Dr. Greg Andrus, NASA Programme
Manager at headquarters. He
was short, tanned and sported a

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a nicely twisted fully grey moustache.
He was 50+ He was very jovial ;
not engineering or science type ; he
was a legal person with academic
degrees in Law including Ph.D.

Some when ~~was~~ Greg started to
~~say~~ say some thing, he would
talk about 10-15 mins and
pause ; when I tried to say
some thing : " Rajan, I have
not finished yet. See, I am
a lawyer ; it was just a
preamble ! "

He used to invite
Gama, Vijay & ~~me~~ me to
his nice house in West Virginia.
It was a posh house. " See

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This is a place of landed gentry!"

He ~~would have~~ ^{usually} invited many NASA colleagues and many other friends.

~~Now~~ Almost all of them came with families. They used to ~~put~~ place

an empty ~~to~~ liquor bottle at a place near entrance and then go inside.

I was curious. Later Greg explained to me that some obscure ^{W.V.} Virginia

law did not allow ~~the~~ ~~a~~ ~~home~~ a person to serve liquor to

others (guests) in his house. (Maybe it

was a bar ~~table~~ But the guests can come with their own bottle

of drink and drink in the host's house! So the empty bottle

is was to show that they were not served liquor; they drank their

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own drink!

Similarly when the companies which NASA Govt employee visits, gave a party, strict laws prohibit their partakip of the food ~~there~~ given by them. There used to be a bowl in the restaurant in which such a party ~~is~~ was given, ~~for the Govt~~ The Govt employees would take a few (small denominations) dollar note and drop in the bowl! "Well, we bought the food & drink!" These were some forms of ~~American~~ America's legal hypocracies! May be these laws ^(or procedures) exist now too!

~~245~~
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Patti (Greg's wife) and Greg took special care of Goma, who was a strict vegetarian. Vijay also had some place to play. Greg used to tease me for being a teetotaler. He would say "Rajan, I had kept a special drink for you: Shirley Temple!" loudly. He would add "Goma, you can take too!" It was a special non-alcoholic cocktail reserved for children. The name Shirley Temple (Goma knew as she used to see English movies) came from the famous actress who started acting when she was a little girl. (So I remember!)

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In one such parties, Greg vowed, "Goma! See I will make Rajan a non-vegetarian before he leaves USA!" I used to reply "Greg! In principle I have no objection as I eat meat though born and brought up in a strict vegetarian family. But when you challenge me, then no way!" I did not drink till I left USA; it was ~~not~~ much later in 1975 when I was in USSR, after returning to India, when I had the first sip. It is a great story reserved for later.

In addition to these social parties and our picnics, Goma had her own social

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in the apartment complex where
we stayed and also a few
Indian NRI's. The ladies parties
were separate with each bringing
~~their~~ a special food and
enjoy at a particular place.

Uma ~~was~~ used to tell about
it to me later. One

Radha & Jayarama Rama Sastri,

VK Balasubramanian & family

were such places. ~~Here from~~ Sometimes

we went as families especially
to VKB's place. As a cosmic

ray student in PRL, I had
read VKB's excellent papers

in ^{cosmic} Gamma Ray's ~~Astro~~ measured

by satellites. He was a senior
person who was ^{a regular} ~~an~~ employee
of GSFC.

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There was one interesting person called Aldo Merillini. Short, stocky person; head part ~~was~~ bald and rest of the hair closely cut; a golden rimmed spectacle. He would come to project office, not very regularly though he had a room. May be he did other work for GSFC. Bernie used to be tell me that Aldo was great in budget estimates. There would be some crisis-calls (ASAP type) for giving estimates for the next satellite ATS-G which was also in principle part of the project. & for some items, an extra hardware was done for ATS-G (some of them ~~may~~ might cause schedule criticality if a decision on ATG-G were delayed. Also being at experimental/developmental

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stages, options for payload changes would also be considered. NASA HQ continuously considered various options so that they could take "rational" decisions. But some of the engineers in the project team, including some time Thule, Sabelhaus, Bernie Tondell used to cut jokes on such options.

All the same they have to give estimates. Bernie told me that if Aldo gave numbers, it would hold good $\pm 3\%$ even when later tenders ~~are~~ are called. I thought

Also he said, Aldo splits everything into smaller assemblies and estimates. Individual estimates ~~go wrong~~ went wrong.

But on the whole, he came out on top. I was reminded of the Structures

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person at Lincoln Lab (LL). The lesson I learnt was that a project programme requires persons with

various skills, some of them ~~which~~
which might not fit into precise

personnel specifications. I had not at that time looked into

recruitment rules / processes of NASA. It did not occur to me at all, as I was involved

in detailed engineering & Systems Engineering aspect. ~~Or~~ Other organizational management issues was

not of my great concern. Later on ^{to my} return ~~on~~ I had to work ~~on~~ on it for ~~a~~ substantial part.

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At Pont for technology
~~and~~ development and project
management, I learnt a lot.

The NASA review systems were
superb. ~~I was~~ ~~Due~~ Due to actual
work experience with the NASA teams,
~~at~~ the prime contractor place,
and also with the subcontractors with
real time experience for a long
period of about 3 years, my skills
had been internalised. That helped
all through my professional
even beyond ISRO. My oral
and written communication skills for
such matters increase tremendously.
In addition ~~for~~ due to the association
of Greg Andrews, his tips on several

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NASA

matters of L/HQ work, gave me a good exposure to programme management skills. So much so NASA project / HQ programme management teams depended on me for several write ups which occur in relation to ATS-F project - SITE interface, including the ~~prog~~ progress report about Indian readiness (in fact it was supposed to be done "independently" by NASA)! But they had confidence in me to be fair and also not to tell it to ISRO bosses. But doing such preparations, I would also put forward the Indian situation when they had not understood it well, in their assessment. Some of it

were meant for reporting to ^{US} Congress etc also.
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In this process, I also learnt about preparation of View Graphs, a good method of managerial communications.

Unknowingly I was being groomed for Headquarters/Programme ~~to~~ ~~my~~ management. Probably some of these feedback ~~is~~ from NASA team ~~and~~ (specially by Greg Andrus) might have ~~influenced~~ influenced P. J. Dharwan's decision to have me at the ISRO Headquarters on return.

My "high speed" talking had considerably come down to suit the American hearing speeds, though my accent did not change. I never tried to change it,

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Though I had met a number
of Indians in USA who attempt
to change it (some successfully,
some awkwardly!).

Development One Project Management & Tech
Aspects I learnt from many people
at NASA GSFC, Fairchild and a few
from sub-contractors. I mention here
a few items. Johnson & ~~Frankstein~~ ^{Finstein}
were two notable persons at the higher
levels of at Fairchild having
~~director~~ direct (almost daily)
interface with NASA - GSFC. Frankstein
was technically very sound and
was in touch ~~in~~ with almost
every aspect of the satellite &
ground ~~so~~ ~~operat~~ related aspects.

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He was a relatively heavy smoker and had puffs under his ~~eye~~ eyes and a reasonable size paunch.

He alone ~~was~~ could deal with even the most aggressive managers of the NASA sub-system manager thus inspiring confidence in the ~~for~~ Fairchild team. Bernie had a lot of trust in him.

In between Bernie used to say ⁺⁺

"Frank, you are not bluffing no?" He would also reply "Bernie what do I get by bluffing; it is equally our satellite!"

In the overall he commanded respect for his knowledge and trust.

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Johnson was senior to him in the Fairchild hierarchy. He spoke very little. When NASA team went with problem which they considered as major, he would listen to them calmly and reply in a few words. If necessary, he would promise to look further and would keep it. He was opposite of Frank Feinstein. Johnson was a small stature, typical British origin looks. But J & F made a fine combination. ~~I~~ I indirectly learnt lots of social skills, as well, from them when my return to India toward the end of 1973, both J & F offered

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me a job ~~and~~ in Fairchild and told me to stay on. Something like \$50,000/- ~~was~~ per annum was offered. I don't know what the going rates were then. ~~From my own~~ ~~also~~ If I had to count my own allowances in ISRO, it was some 6 to 7 times more! They were sincere and possessive for it.

I asked Goma; she was not very keen to stay on in USA. Her attachment to her father was the strongest pull. For me, it was the Sarabhai mission which he had injected into me (though

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he was no more) that bonded me to ISRO. I had no legal bond to return. It was not a personal or I can bond with VS (Sarbhai). It was the bond of various projects, the space technology & application visions, that ~~made~~ bonded me.

I somehow felt that I was going to achieve so much for India and Indian people! (A great illusion perhaps, not so much as a pride, but some form idealism mixed ^{up} from Subrahmanya Bharata, Vivekananda et al and closer by Sarbhai..

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~~Bernard~~ Bernard (Bernie) Trudell
role had been all round. Right
from the day ~~we~~ I came to NASA/
GSFC. He was a kind person, not
only to me but later I found
for all persons in the project
office. Even when he got angry
with somebody else because some
work was not completed etc, later
he would compensate it with
some kind words. He was a
Catholic; wife Agnis; they had
many children (5 or 6 I don't recall
now). He loved his family.
He was particularly taking care
of his wife Agnis, who could
~~be~~ sometimes be very difficult.

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He loved eating good food.
Being ~~st~~ short and ~~have~~ getting
fat, he used to get into
the groups to "bet" on weight. Something
~~4~~ like 1 week (a day fixed)
10 pounds or 5 pounds loss etc). Those
who ~~don't~~ did not ~~to~~ have to
give some \$ or amount of dollar
to each of the members! I had
seen Bernie some times with
blisters. ~~then~~ Then all over
his face, hand etc. Then he
explained to me how he had
to just lose a pound to
avoid the penalty. Therefore
he took very hot shower
for a long time to sweat out

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to ~~lose~~ lose that one pound!
He had exposed me to simple
aspects of middle class &
~~Ind~~ American life. He
had also told me & Goma that
whenever any thing / any help
~~is~~ required or if there were
any problems "Just call
Bernie, don't hesitate: any
time of the day!!"

One day may be in 1973,
he has requested me to take his
big para-brake car to Baltimore.
Agm's - family were there; he was
joining later. Goma, me & Vijay
were there. ~~It~~ It was first time

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It was still ~~to~~ out the period
of e-mail in Indra. No further
contacts.

A person like Bernie
is crucial for any project which
is on high-pressure-development -
mode with tight schedules. Even
though he was mediocre on technical
matters, he kept a good warmth
with team members and because
of him, between team members.

He had taken me
to an exclusive ~~Stage~~ 'Stag Party'
≡ (males only) for Maryland Crab
function: Small, salted crabs, boiled
well; we need to break it with
a small wooden hammer to recover
a small ~~part~~ portion of crab meat;

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I was driving a big car. There was a good free way alright. ~~When~~ For the power-brake ~~also~~ ~~at~~ and

power steering it was first time.

I managed. It was getting evening when ^{we} _L were to reach Baltimore. I

found that battery was low!

I could not put head lights on! So just on parking light

(legal minimum) I drove and

reached. We stayed that

night there. Bernice came and

cooked..... nice time.

We have thus many good personal contacts also. We could not maintain it. Once when

I was in Delhi, Bernice called me from some where; he was in a group and rushing. I went

(P.T.O)

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Others ~~it~~ would have ~~too~~ been along; the tie to the 'me', had to be without it! Like this there were many instances.

One memorable thing was that he gave away his family crib to us for Vijay to sleep: almost at the beginning of our meeting, when he helped us to settle down. "Rajin & Goma

Why do you want to buy a new crib? We have a family crib. I inherited it and also my children had slept in it.

Agnis & I are not going to get any more children. I don't

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think my children are going to
take it on! & I will bring
it and use it for Vijay.

Maybe you can use it for
~~the~~ your future children!! It
is a gift from our family."

He pulled it out of his storage
~~and~~ space in his house and
gifted to us. It was a ~~four~~

wonderful crib. We have photos
or slides of it. Vijay as a small
baby (under 10 months and even
later) enjoyed. It was adjustable
so that he could not get
out even when he was 3 years.

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It was detachable easily and ~~can~~ ^{could} be fixed back. We took it ~~back~~ to Indri. Vikram (our second ~~and~~ child) used it as well. Later Goma gifted it to some person (I don't recall who it was).

Anthony Sabelhaus, who was also a Catholic, was a different person. He was reserved. Tall. Nicely build. Flat stomach. Forehead full of lines. Face full of ^{lines} ~~dots~~ black dots. He was also very nice with me. But he never got into personal

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family friendship. He gave full freedom for me to function and learn in ATS-F project. Because of his (He was Satellite Manager, full authority over satellite designs, test, etc) full endorsement and encouragement of my involvement in the Project, I could have access to every document of ATS-F project, including some which were "administratively confidential" (basically they dealt with contract changes, changes in costing, schedules etc)
~~That~~ It was necessary sometimes

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to read them, because what we dealt with technically should also be seen in the contractual context. That was a great learning. ~~When~~

When Anthony Sabellano (Tony) had to take some complicated decisions, he used to call the concerned persons, discuss and then issue his orders in written form. ~~That~~ Most of such cases also included me, as I dealt with a number of sub-systems, test plans etc. It was an educative process for me, in project-decision-making where there was no simple

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'YES' or 'No'. I ~~was~~ vividly
remember two cases.

One was in the power system.
~~There was~~ It was a case of a
window ~~for cents~~ of time pulse,
for certain control functions. Whether
it should be 10 milliseconds or
more 100 milliseconds was the debate
between NASA Sub-system & Manager
& another Fairchild Manager. (The
number I have given here ~~is~~ may
be different. But it gives the
order of magnitude change on
which the dispute was!) There
were several committees which
were set up to deal with

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resolve it. None succeeded in reconciling the two divergent (adamant) ~~views~~.

positions. Frankly, I did not understand the engineering detail.

I was also one of the spectators of the meetings between the two

~~the~~ managers. Feinstein did not succeed. He also said "Tony

I give up; I do not want to

take sides. Nor do I want to

stop my guy, as he seems to be very convinced about it. He feels

~~it is true~~ that his position is

crucial ~~for~~ ⁱⁿ the interest of

the Satellite!" Johnson also

did not resolve. He left it.

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Days, weeks, and months passed
I think almost 6 months were
over in this. No more indecision
was possible as the hardware
for prototype satellite had to be
frozen. Any further delay ~~would~~
~~can~~ would impact satellite
schedules.

So Tony had to decide.
I recall a long meeting he had
at Fairchild premises. He had
any body connected with it at
the meeting; he had brought
a few experts from other
NASA directorates in GSFC.

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Arguments, counter-arguments, questions, answers... went on and on for about three hours.

The situation was same as it was over the past six months. Tony tries to ~~as~~ resolve it by asking a few questions; also appealing to the two warning ^{power} ~~sub~~ subsystem managers to come to a meeting points. Tony did not ~~want~~ want to side with the NASA Project ^{power system} ~~man~~ man who was his subordinate, ~~not~~ nor want to put down the Fairchild ~~sub~~ power system manager who was after all a contractor person. (He did not want to invoke

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a doctrine, "Customer is right!"
In this case the customer, who
here, was NASA GSFC.

Finally Tony in exasperation
said ²⁴ "Finally, it is left to
Tony to decide, on this of "s-o-b"
problems (Tony was ~~at~~ the full
expansion of s-o-b, in crisis
situations!). Now hear what
Tony decides. No body here
and earlier have understood
what ~~at~~ exactly is the problem.
But both of you are stuck
to your numbers. So Tony
is going to ~~use~~ use the

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Solomon wisdom: $10 + 100$ divided by two; the Gate width will be 55 milliseconds". He wrote the decision and gave it to the team.

Greg used to say "Rajan a good manager, had to take decisions quickly, so that too many items are not pending.

At the same time, he should also know how long one can ~~pro~~ procrastinate for some cases, where he feels uncomfortable. The timing is very important!"

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Tony had practised it in action. Also he had taken a bold decision. He should not be worrying about it afterwards.

None of us knew what the effect of the decision was in actual working of the satellite. ~~Later~~ (After flight

ATS-6 ~~we~~ did not have

the problem, the two warring ^{sub system} managers envisaged. Maybe Tony's Solomon wisdom prevailed).

Another case was regarding the Test Plan; that is something which the Satellite

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had to approve formally. ~~in~~ Test procedures follow from it. As

I had explained in the earlier portions, the cycling of the

Test Plan was a long process.

We give comments. Some of

them would be ~~test~~ resisted

by the Prime Contractor Fairchild

or subsystem managers who

are ~~to~~ doing it. Reasons

may be from technical to

~~to~~ schedule to cost considerations.

~~At~~ If some type of equipment

~~are~~ were not there with contractor/

subcontractors/vendors, they would have to purchase it. In their

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quote for NASA, they would not have assumed it. They would argue, ~~the~~ why that type of testing? Tell us why the

one we proposed is inadequate? With our proposal we can assure actual testing for the each of the specifications which are given in the final Phase I contract. After all we had to adhere to that document of specifications. Now, you people are introducing tests which are beyond the scope of ~~provi~~ testing for the approved specifications!"

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Several such technical arguments
~~They ^{was} ~~may~~ ~~not~~~~ They were not
~~it~~ always right. It ~~is~~ was
our job (NASA GSFC Project
Team's job) to prove why
we need.

Finally after several
~~such~~ such debates, arguments
and discussions, a "final"
Test Plan was arrived at.
Tony was in the loop all
through, though she would
not get into the nitty-gritty.

Again the time had
come to ~~be~~ approve. Still there

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Some murmurs from NASA ^{GSFC} Project
side. But almost all had
agreed from Project, Prime Contractor,
Sub System Contractor & Vendors.

So the approval day
& time had come. ^{A few of us} ~~We~~ were

around him in his room
when he was to approve. He
talked a little bit to people
around and took his pen.

"S-o-b, now it is time
for Tony to ~~sign~~ sign" While
signing his final signature
he was telling to himself

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and to us!" Anthony Sabelhaus
is signing it. It is an
excellent Plan to deviate from!"

He signed and gave. What a
sense of humour.

For me it was a lesson.

We should be ready to change it
as tests may well show the
reality. It ~~is a~~ was a contract

but still one could not escape
the realities of technology development
and uncertainties that ~~are~~ were
hidden in it. It was ^a useful
lesson for me when I returned

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ISRO, whereas we were also producing many such contractually binding documents (even within ISRO).

My copy past
Later as I will elaborate, Tony took a special step to write to Roy Chitnis (early 1973) to keep me with ATS-F project at least till the satellite integration was completed as ~~it~~ those months ahead had items which would make us (me in particular) to grow fully in Satellite Development. This was, when he knew, that ISRO had decided to withdraw all of us from ATS-F project without

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even consulting NASA. The ~~argu~~ basis given was that all the satellite work was completed by end 72/early 73 and we could be moved out. Tony had explained in a letter / telex as to how the assumption was wrong. He started the letter / telex saying that it was totally personal opinion which he thought he should give in the interest of our learning. ISRO considerations had behind them some deep (possibly petty) "politics". I think the letter had some effect and I was allowed to stay beyond May 1, 1973 to end Oct 1973. He was in particular happy with my contributions

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to the project which he states
in his telex / letter.

~~Job~~ Eric Metzger was
an interesting person and was
responsible for all operations of the
satellite post launch, its manoeuvres,
orbit raising and then for all
on-orbit operations. He had
equal status to that of Tony, the
~~Sp~~ Spacecraft Manager. He also
reported to the Project Manager, John
Thole. However, the number of ^{professional} persons
for each subsystem was more
in number with Tony, Satellite Manager
about 15 or so. Eric had ^(or one person) none. He
had to do it mostly with Contract
Team, Westinghouse. Of course

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ATS-IF

he would draw from this project personnel
reporting to Tony. ~~The~~ Eric had
access to all the documents
from ~~Fairchild~~ Fairchild / Subcontractors.

He ~~can~~ could have a say
on each subsystem / system / test plan
etc, as it might impinge on
~~this~~ his function: Satellite Operations.

He is An Operations Manager
is appointed right at the beginning
of the Project when the contract
is ~~is~~ awarded to the Prime Contractor.

NASA ~~considers~~ considers
that role equally important. Actually

~~The~~ In India for SITE we had

only Proj EV Chitnis as overall -
in charge. Other roles were diffused
None for operations, especially

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When ISRO's role in SITE experiment involved a large number of ground systems and coordination.

Sometimes ~~Eric~~ during the meetings, Eric used to ask for certain clarifications. Normally subsystem ~~mgr~~ managers at the project, do not give special attention to the operations aspects. Most of them ~~it~~ would be moved to some other satellite project by the time ATS-F ^{final} was in the integration phase. So they ~~go~~ used to give some terse but correct technical replies. ~~IF~~ When the answers ~~are~~ ^{were} not adequate to be transferred into operations

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document Eric wants tell Tony:
" Tony, please note that I am
not going to have these bright
guys with me. All of them
would have gone. I will have
a bunch of idiots ~~who have~~
with me who have to operate
the satellite for me. That too
this is a geosynchronous satellite
and therefore we will have to worry
about it for all the 24 hours.
So please have a heart. I
need ~~these~~ the technical items
to be given in a simple form so
that the Westinghouse guys can
transfer them into simple documents!"

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It was often a running battle like this. Every body was so busy, no body bothered about what would happen two years from then! Similarly Eric's request to the Subsystem Manager to give written inputs to the Operations Document as per a format given by him would be unheeded.

Eric's response to it was interesting. ~~He~~ He would get a document done with whatever inputs he had. He used to tell me also: "If these guys do not do it, I ~~&~~ will have it done!"

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Then he would present it to Tony during the meeting with the sub-system managers and tell:

"Tony, ~~as~~ a draft Operations Manual has been done for

ATS-F spacecraft. ~~Have~~ Have

your guys look at it; cut - ~~page~~ ~~part~~; or throw out

some. Eric is not proud

of his draft. You can mutilate

it, whatever way you think it is correct. And then give it

to me!"

How to get his job done" without being proud of one's

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own draft" was a great lesson. He used to rely on the services of Gill Birlock and Howard Gallaway to have them collated for revised draft etc.

When Eric uses the word 'guy' often, it is to be noted that in those days I have not seen one ~~lady~~ woman professional in any of the projects or divisions in NASA/GSFC or Lincoln Lab. It was a man's world for technical/scientific profession. Women were only in the secretarial functions; not one male!

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Even in ISRO, it was so in the beginning. Then I found from mid-1970's women were working as scientists/engineers.

Once Eric had an urgent technical job to do, for which he had no easy way; Bill Redisch wanted it too, as Systems Engineer. That was about ~~have~~ the global Telemetry & Telecommand (TTC) coverage during the orbit raising phases of the satellite. It should be noted that NASA had been in the initial

stages of Geosynchronous Satellites. Global coverage were more for low earth orbiting satellites.

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Which ~~has~~ They did not need
that much of continuous coverage
as for the raising of the Geosynchronous
satellite from the low earth
orbit to Geosynchronous Transfer
Orbit (GTO). That was the
crucial phase in which the
solar arrays had to be deployed
in a complex maneuver. Though
in theory an omni-directional
antenna is designed, in practice
there will be gaps (holes!). Where
they occur is crucial. The
antenna people ~~would~~ would
give a large number of measurements
~~in~~ all over 360° , with different
slices to give an idea of global

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Technically that is the way to give data / information. But what does it mean for the user.

In today's world (@ 2000 onwards) all these can be seen in ~~the~~ a computer with zooming capabilities. In fact they could be animated to give a picture of how the coverage moves through the globe when ATO manoeuvres ~~are~~ are taking place.

Yes, all these can be simulated as "Virtual Reality" It was not possible in 1972/73 even for NASA. It can be drawn ~~as~~

in maps in two dimensions but it does not give a feel.

"So can we get it drawn in a globe?" - was the question ~~with~~ ^{which}

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Eric Metzger & Bill Redisch
posed to me. Yes from the full
~~book~~ report of antenna
patterns available from
test results running over
several tens of A-4 size
papers. So the job was
given to me. Where to ~~be~~

get a reasonable size globe?

"Ask Susi; She will figure it out!"

I asked her. Susi asked me
how soon I want. "Just now,"

so that I can take home,
draw ~~it~~ on the globe and give

to Eric". Then she told me

"I will get ~~Pitt~~ Gill Bullock or
Howard Gallway here!" and she

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~~and~~ She gave them a contract number ~~to~~ ^{to} and ~~to~~ said "Take Rajan to ~~Toys~~ "Toys & Toys" nearby. Get Rajan the ^{big} globe what he wants. Get the bill and put it in this contract in the ~~stand~~ ~~f~~ standard form!"

We rushed. After seeing ~~or~~ ~~ft~~ a few globes I selected one. Shouldn't not be too big ~~not~~ nor too small. I took it home ~~to~~ with antenna pattern reports along with the possible trajectory projection of satellite in GTO.

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It was not an easy job. I had to have a lot of "solid geometry" imagination; I was not best at that! But with a lot of care, I did it. It starts

shows the coverage area, the gap area etc drawn on the globe with different colours.

Eric Metzger & Bill Redisch were very happy.

I asked Susi later sometime. "Susi, What is it? You told some contract etc and I saw ~~what~~ the final bill charged to govt, something like \$85. Actual price we paid was around \$15. I could have ~~got it~~ paid and got it

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reimbursed". At least that was so, in the PRL/ISRO I left before I came to USA. (We had done so later in 1980's also).

Susi said: "~~NAS~~" Rajan, NASA procedures are very complex.

I have to send an incident, designed by Bernie & or Tony. It was late afternoon. Next day the stores people will see it. If it was not in their stores. They

will send request to other NASA Centres. If it is there fine. Otherwise, ~~we~~ ^{they will} have to send to other other federal labs. It may take 3 weeks! ^{1/2}

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What I did, was to convert it into a Wishinghouse ~~to~~ contract.

It has so many overbeads which is as per rules; they have dists. Hence the bill! That is how our work works!!"

I was amazed by the NASA bureaucracy (bill then I had not been exposed to what a bureaucracy was. Even Suro did not use that word! (I am using the word after I had started understanding the word on return to India. Still not prevalent in ISRO for a long time!)).

Another daunting job which Eric Metzger had given me