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 Hammarstrom

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Some Items for Long Range Consideration

In viewing the past years effort by myself and all concerned on Problem 54R06 -29 I would like to offer a few comments, and suggestions on the long range aspects of this job. This is not intended as an attempt at providing all or even a significant number of answeres to potential problems, but merely to bring these items up for discussion and compromising by all people concerned well in advance of any deadline dates or operational requirements.

[redacted] while not at the present limited by the receiving system has to in some areas "work around" the receiving system. A few areas which should receive some thought and consideration after talking with [redacted] are as follows.

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Item #4, a new and improved threshold devise for the computer is being worked on for [redacted] But more important here a specification should be given to Dix's people as to the maximum antenna pattern variation allowed on the data antennas. The range of variation that is on the present O4A ball in particular I feel could be much improved.(app. 10 db) This is not to blame them but a new harness or hybrid should be used which will allow much closer control over patterns

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and possible RFI problems due to mismatches. At the same time another solution may be looked at, that of a new data frequency that can use a separate harness and won't be on the band edge of a high interest band. The 149 range is down to 200 kcs separation. Also in the receiving system a log period or non-parasitic dipole design (Rantec Broadband for example) has inherantly better off frequency antenna patterns which will help against some of the RFI problems at the sites. Item #2 some what relates to this new look at antennas as I shall get to. The receiver Bandwidth of 27kcs is not

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Signal power received can be increased by going to increased antenna gain but a limit is reached as to what is the narrowest beamwidth which can be safely tracked by the average operator. Since a tracking signal is provided perhaps an automatic tracking system could be installed. Answers on these and other areas can not be just written down, but by getting people on the project working on a long range basis with [redacted] Ed Dix, etc. We can attempt to answer and coordinate some of the long range questions.

Another area although it is somewhat related is that of Quality Control Analysis. At the present time I am able to put about a 10% effort into support of this effort and one of two other people are putting equal of less time in on it. [redacted] good idea needs more work and a

Secret [redacted]

manual for the operaters. A few modifications are necessary on the present Bay State before it can be put "on line". But more important, work should be continued on a new generation of computer which will make up for some of the short comings in the present computer. Some of these are shorter reset time. In high density bands where the idea of automatic processing is of most value the relatively slow recycle time of 1/15 to 1/5 of a second allows the missing of close bursts and hence removes scan information on these bursts. A change in the logic to allow reading of simultaneous bursts and other changes should be worked on. In addition an effort should be made to make repairable by material men. An area which has not even been touched is using this to [redacted] This would be a start in the research necessary to give what Hank Decourt ask for in the "Contingency of an all out war" namely, an "on line" electrical readout of information. Under general comments a few items which might bear comment are. 1.) The elimination of a common reset for all balls. Several passes were missed already due to this. 2.) A short command burst on the order of 100msec. This short burst would reduce the chances of an unwanted take over of the balls. To intercept a 100 msec command would require an automatic recognition while a 2 msec. command a man could recognize and breakout. This short burst system could be installed in parallel with the present system in the birds to give added redundency and back up. Also this short burst would eliminate the problem

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of commanding a ball such as o4A which is spinning ~~xxxxxxx~~ with an antenna null and quite hard to command with the long burst. 3.) An arming and firing sequence completely different and in several sequences for the "spin up" rockets. 4.) Work on an [redacted] system for all bands which would assist the automatic processing in identiding individual radars. 5.) Work on developing a real time "thermometer of radar activity" from pass to pass. The approximate number of radars and their approximate locations are known, by gearing a second generation of Bay State type computer with a limited [redacted] I think a statistical average could be developed to keep a crude check of individual radars which are turned on.

The last observation I would like to comment on is that of personnel. The areas I have just touched on are areas which while ambitious are not impossible to undertake with a program of this size, but enough personnel should be provided. The most glaring example of the short handedness was on this last launch when a man who while extremely capable had to go into a site which was having problems with only a couple of hours of briefing and no recent contact with the project at all. [redacted] and by sending an (if we had enough) individual out who knows the equiptment and some of the background of the problems at the site some progress might have been made in improving what ~~is~~ should be our best sight for over all cover. Along the line of personnel a big help could be provided by a secretary

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with all clearances. While this may be hard to come by it would certainly free project personnel from answering the phone, typing classified reports, and provide a central filing system for the project. Individuals such as Vince and Reid who are ridiculously over worked could make dictaphone reports of meetings, work problem areas, equiptment to be bought, and have the items typed up, ordered, etc. without inhibiting their other work. Also this would allow preparation of such things as the S.O.P. which while being rewritten by [redacted] is also badly in need of a technical rewritting.

In summary the last year has had a lot of change in the project, new balls, new receiving complex, new transmitting complex, and a quality control complex, but most of these efforts have been a redressing of old equiptment and techniques, and very little effort in the new areas which require research and developement. These new areas have been worked in sporatically, but not with any appreciable effort and planning. Thus far we have all been quite busy with the day to day efforts of keeping the project going, but we should enter a period after the quick fix on the antennas when some long range goals can be planned and some definate programs started. As I have mentioned previously a few areas would be, receiving equiptment in support of [redacted] and elimination of a constant maintence problem in the Tape Tones, analysing equiptment for an "on line" readout, closer working with Dix's people to gear the balls more to "our effort", an up dating of the S.O.P, a combined hut installation plan for all sites and a

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complete up to date [redacted] site operating condition and maintenance file with reports of all trips made to sites. These items mentioned are by no means all enclusive. They will not in all probability lead to breakthroughs, but they may help to prevent break downs and give some long range goals for project people to coordinate on and work together on with out duplication of effort and straining of tempers. This will not make large steps in improving the quality of the data which on the whole is quite good, but it will give a closer control over the entire project and somewhat help to evolve a long range optimized project.

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