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THE DEVELOPMENT OF A PROJECT PLAN FOR THE GET AWAY SPECIAL PROGRAM

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ABSTRACT

Trying to get a project started? Well, since the introduction of the Get Away Special Program, there have been 451* reservations placed by people who, just like yourself, are eager to send a small payload into space; and yet, only 33* of them have actually succeeded. Even more staggering, many of those who have flown have done so more than once; meaning that less than 10% of all GAS users have actually sent something into space. This paper approaches some of the problems that face GAS users and should be especially helpful to those who are new to the program. Some of the subject areas include selecting a project, and payload management.

SPECIAL NOTE: This paper is especially written for the "first time" Payload Manager. Due to the limited space in these proceedings I was only able to put a fraction of the information into this paper that I had originally intended; however, I have committed myself to documenting this topic in detail so as to provide GAS users with a better means to organizing their projects. So relax, this is not a technical paper. Your suggestions and comments would be appreciated.

(* as of June 15, 1985)

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INTRODUCTION

NASA's Get Away Special Program has presented researchers with an opportunity to do what was once considered unthinkable, experiment in space at a relatively affordable price. In 1981, the Space Transportation Office established a user price of $718.00 per pound for major payloads onboard the Shuttle. This is quite reasonable for the typical users of space such as the military, larger commercial entities, and foreign governments; however, in all reality, any one individual would have to be quite wealthy to afford to put a small payload into space. With the inception of the Small Self-Contained Payload Program (SSCP), NASA made space available to prospective small payload users for an exclusive price of $50.00 per pound. Hence, the Get Away Special got it's name. Why is it, then, that NASA does not have GAS payloads booked through the end of the decade? This dilemma seems to stem from the rather complex nature of the GAS Program in general. This is by no means the fault of NASA; it is, however, an indication that the program is young and much of the support hardware and services that one would expect to have at his access simply do not exist, or are very limited.

In conversations with other GAS users, there seems to be some continuity in the type of problems that face many of them. There are GAS users who cannot decide what to put in their experiments; while, of the ones that have decided, many lack the engineering and technical support to turn their ideas into reality. The GAS user must be careful not to exceed his abilities. The first payload should be simple, utilizing those resources that are available. Before starting on a Get Away Special project, the user should familiarize himself with the basics of the GAS program.

PROJECT REQUIREMENTS

At its present level, the GAS Program requires an experimenter to have some basic engineering abilities; also, some familiarity with the Space Shuttle and its operational environment. Do not despair if you should lack these abilities. There are engineering support groups and small companies that are in the business of designing systems for GAS payloads. These engineering services can be costly; therefore, GAS users may be better off duplicating existing designs rather than paying big bucks to find new solutions to solved problems. Conserve your resources - know your costs. Publications geared towards the new users of space can be obtained through the Government Printing Office (GPO), the local library, or through a regional NASA center.

WHERE TO START

Following the placement of your GAS payload reservation, NASA will foward you all kinds of documentation pertaining to the Space Shuttle and the GAS Program. Read it, and become familiar with all the options and limitations of the Get Away Special. It will save you time in the long run.

DEVELOPING AN PAYLOAD CONCEPT

The Get Away Special begins with an idea. A realistic and, more importantly, an acheivable idea that has merit. There are some considerations to take into account before you develop an idea:

- ◇ WHAT ARE MY RESOURCES?
- ◇ WHAT CAN I AFFORD?

Resources include education, experience or background in the area of your experimentation; adequate tools, hardware, and/or access to a machine shop; time to work on all the associated requirements for your payload; money to afford the project costs; and help from friends and family, afterall, you might as well share the fun (and the work). Stick to what you know. There are an infinite number of possibilities for GAS experiments. First, consider your own area of expertise and how it can be applied to space. Then consider the environment of space, specifically weightlessness. Consult text and reference books for principles that rely heavily on the force of gravity, availability of air or the filtration provided by the Earth's atmosphere. A simple change of the environment can result in a dramatic change in your experiment findings. Also, consider the needs of everyday human existence, many things that we take for granted will not work in space, and therefore must be replaced. After the first flight, you will have an insight on the needs of other GAS users and can develop support equipment for various applications.

There are associated costs above and beyond the launch costs for your payload. Whether you build, buy or lease experiment hardware, it will represent the second major cost of your payload. Support equipment such as batteries, controllers, sensors and the like, all must be space qualified (meaning that they are very expensive). The purchase of space qualified products and services can cut a might chunck out of the project budget. As I mentioned previously, engineering is very expensive and, in some cases, can be avoided. Many GAS users have sought the assistance of local aerospace companies. Remember that your community is an additional resource worth tapping.

PUT YOUR PROJECT IDEAS TO THE TEST

- ☐ **Do you like it?** Be kind to yourself. There's no fun in working on a project that doesn't please you.

- ☐ **Has it been done before?** If so, what happened? Be sure to examine all the difficulties experienced by the previous experimenter(s). Research your idea. Try not to reinvent the wheel or, even worse, repeat someone else's failure.

- ☐ **What will it cost?** Might as well know in advance if you are going to exceed your financial capabilities.

- ☐ **Is it the best choice?** Perhaps there is another idea that is more suitable for you.

- ☐ **Is there available technology to support this type of payload?** If not, now is the time to look at another payload idea.

- ☐ **Will NASA allow you to fly it?** It all comes down to common sense really. Stick to legitimate research and development. NASA is not to enthusiastic about publicity stunts that exploit the Space Shuttle. None of us are.

- ☐ **Is it safe?** If not, good luck. NASA will require you to safety qualify your payload.

- ☐ **Do you have any experience in this field of research?** Your payload does not need to solve the problems of the world. Develop a project that you can understand. When in doubt, remember:

STICK TO WHAT YOU KNOW.

All of these variables increase the cost of the Project. How dramatically depends on how complex your experiment payload becomes. There are other associated cost for items such as NASA's GAS payload optional services; these include the Motorized Door Assembly, special payload preparation, special handling, etc. Also, there are extra costs such as travel, telephone calls, stationery supplies and reference texts which are fairly inexpensive but add up over a period of time.

PROJECT PLANNING

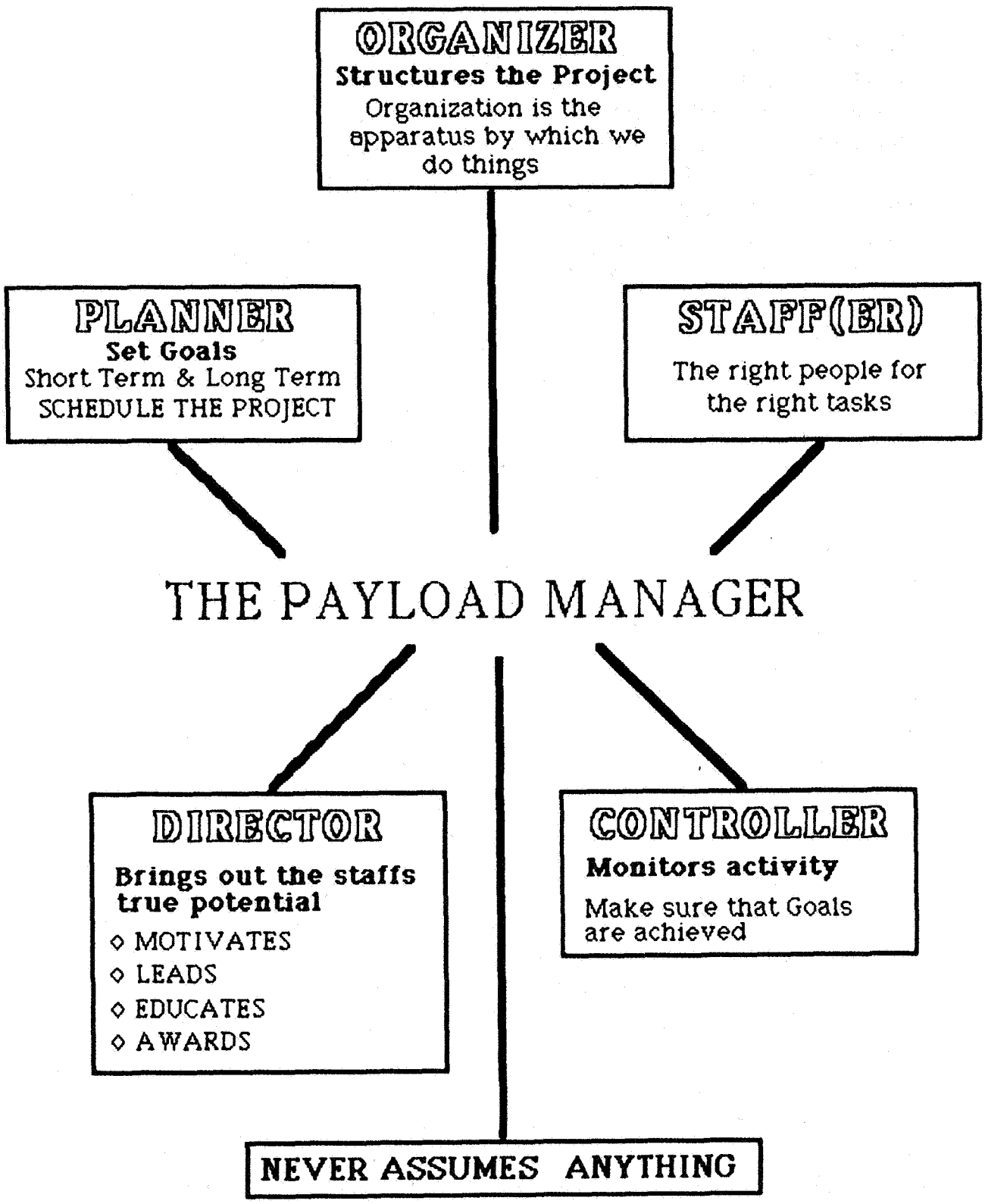
Once an experiment has been chosen, a project plan is the next item of order. Organization is essential; also, knowing "what to do" and "when to do it" can make the project run more smoothly. Before writing the project schedule, consult your GAS user's handbook for important information regarding the flow of documentation and information with NASA. If you are coordinating a group, be sure to delegate duties appropriately and to each person's interest. If you are working on a GAS project as an individual, pursue one aspect of the project at a time; it is all to easy to run circles around yourself and not get anything done.

DOCUMENTATION

Document all aspects of your project. Keep a log book of important developments and events. This provides a means of following the progress of the payload. Documentation will help you keep track of what's going on, especially when the pace of the project picks up. All experiment ideas and other payload concepts should be documented as well. As you become more familiar with the system, you will develop all sorts of ideas for projects to come.

THE FUTURE OF THE GET AWAY SPECIAL

In view of the many challenges presented by today's Get Away Special Program, we can easily compare these difficulties with those of the early personal computer industry. Imagine what it would be like if you wanted to write a simple program that would display seasonal star charts; but first, you had to build a computer on which to write it. This is what the personal computer world was like over a decade ago. Today, however, PCs are available everywhere and there are programs that help you develop programs. The personal computer has become "user friendly". The same can hold true for the Get Away Special. The greatest challenge is continuing the growth of the program so that, in the future, there will be an excess of space qualified hardware and qualified experts; thereby making the GAS Program accessable for everyone to use.


ORGANIZER
Structures the Project
Organization is the apparatus by which we do things
PLANNER
Set Goals
Short Term & Long Term
SCHEDULE THE PROJECT
STAFF(ER)
The right people for the right tasks
THE PAYLOAD MANAGER
DIRECTOR
Brings out the staffs true potential
◇ MOTIVATES
◇ LEADS
◇ EDUCATES
◇ AWARDS
CONTROLLER
Monitors activity
Make sure that Goals are achieved
NEVER ASSUMES ANYTHING

THE PAYLOAD MANAGER

To date, the role of the payload manager has never been very well defined beyond "...the one who has the responsibility for the development of the payload; while being the single point of contact with NASA for the exchange of technical information." The definition expands even more depending on the size of your group and the complexity of the payload. For a university program, such as San Jose State's, the GAS project is managed similar to the way that NASA manages it's projects. We have principle investigators who are in charge of researching and documenting the experiment operations; payload engineers who design the hardware components to support the experiments; and a support staff to work with these key people. A technical advisory board was established to obtain feedback on our design concepts and method of experimentation. They keep us from "reinventing the wheel". These people are the project group's greatest resource. It is up to the payload manager to coordinate their activities.

Communications are essential. Communicate with NASA as well as your people. Keep everyone posted on the status of the project. Motivate the staff and be sure to let them know how important they are to the project. The payload manager must also be a good listener. Know your staff and be aware of their personal goals. Be Objective, and most of all - be fair. Make sure that your project has an identity and a purpose. This was the driving force behind the successful Apollo Program. Everyone involved in the project shared the same feeling of pride and commitment because they knew that they were an integral part of the overall program.

The payload manager is also a controller. He not only must set goals, both short term and long term, but make sure that they are achieved. Making a plan such as this is easy. While scheduling, figure how much time a particular exercise should take, and then double it. Do this for each portion of your project. It is more satisfying to stay ahead of schedule than to always try to catch up.

The payload manager is also a director. Know your staff before assigning them duties. Put them where they want to be in order to bring out their true potential. Finally, never assume anything. Monitor activity regularly and prevent problems by approaching questionable items right away. A structured program is a well run program. It will help you achieve your ultimate goal more timely and efficiently - sending a payload into space.

CONCLUSION

This paper reflects the philosophy of SRDO's GAS Project management at San Jose State University. I am almost certain that there will be changes along the way that will refine and improve our operations for the better; and of course, we will be sure to share them with everyone at symposiums to come. When the Shuttle leaves the pad at KSC, it not only carries our modest payload; it carries us as well. The thrill of seeing the Shuttle takeoff is well worth the long hours of laboring over books, technical notes and the payload itself. Many people will never experience the emotional high of actually sending a payload into space; however, it is in our best interest to get as many of them to try.

Let us not forget that the Get Away Special Program is still a government program; being so, it is subject to the same political realities that have ended similar NASA programs of equal worth. It's a awful thought but, regretfully, it is a possibility. The GAS Program's future is dependent on the amount of use and interest generated from people such as ourselves. We can ensure its growth by spreading the word, sharing our resources and finding new solutions to the problems and deficiencies facing us today. There is a pressing need to help GAS users, who hold reservations, get into space. Those of us who work through organizations, or educational institutions need to establish an ongoing program within these entities in order to make this type of space research a more permanent activity for years to come. It will certainly be a great day when we are able to pack GAS experiment payloads into each Shuttle flight; thus, ensuring the longevity of the overall program.

The real benefit will come in the future, in the form of low cost user programs that utilize the Space Station and other Earth orbiting platforms. Although we have come a long way in the last few years, I believe that the true potential of the Get Away Special has yet to be tapped.