S A T U R N

E X P E R M E N T A T I O N

BY

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+
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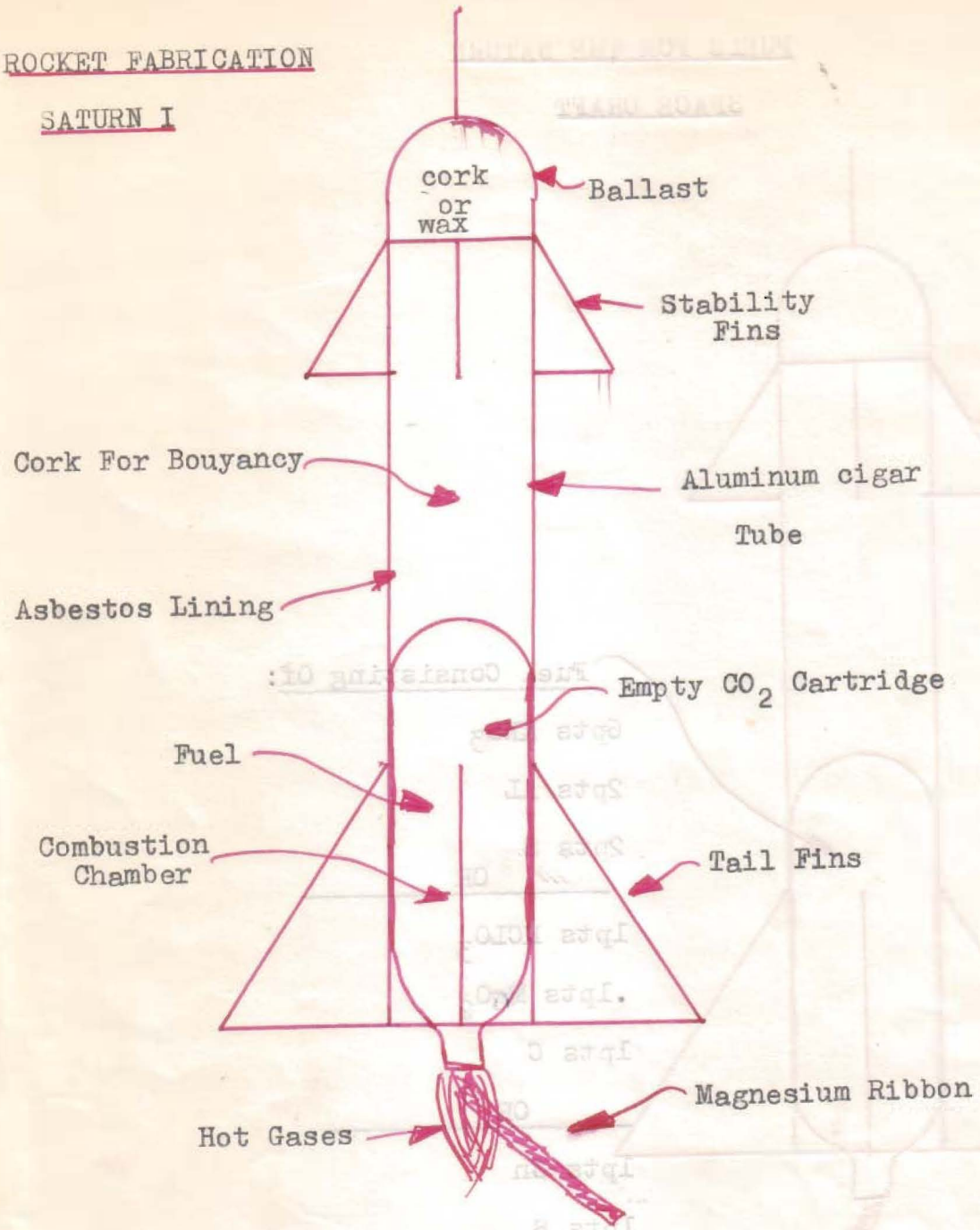
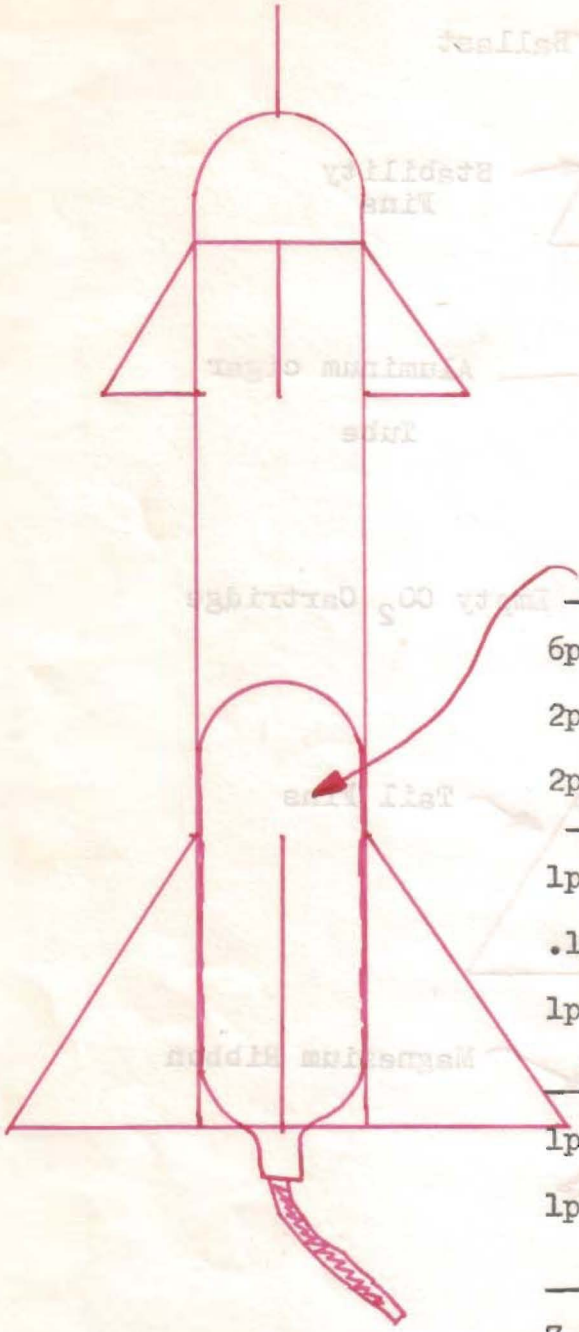
ROCKET FABRICATION

SATURN I



FUELS FOR THE SATURN SPACE CRAFT



Fuel Consisting Of:

6pts KNO_3

2pts AL

2pts S

OR

1pts $KCLO_3$

.1pts MnO_2

1pts C

OR

1pts Zn

1pts S

OR

7.5pts KNO_3

1.5pts C

1pts S

Saturn # & Date	Ignition	Take Off	Footage	Time	Remarks
Saturn I 5/23/63	none	none	none	4PM	Magnesium Ribbon was Defective
Saturn II 5/30/63	perfect	at the end of combust-ion	3 ft.	11am	Heating Element Perfect; Less Weight Compulsary; Better Method Of Attaching Fins.

SPECIFICATIONS

On the inside of the fuselage an asbestos board will be placed. When ready the molten fuel will be placed down the fuselage of the proposed rocket ship. Before the mixture has a chanse to solidify add a magnesium ribbon. Inside the fuselage before the fuel capsule is put in, some wax will be placed for a ballast. A ballast is the weight in the tip of the ship so that the craft does not waver in its short test flight. On the outside of the ship there will be 4 fins to cut down the wavering of the flight.

We will test 4 kinds of fuel. They are as follows: I 4pts KNO_3, 2pts AL, 2pts S. II 1pts. $KCLO_3$, 1pts C. III 1pts Zn, 1pts S. IV 7.5pts KNO_3, 1.5pts C, 1pts S. In my opinion it will be a tossup between #1 & #3 fuels. To get back to loading the fuel, I will not try to melt any of the mixtures. Iwill make solid fuel by loading up the combustion chamber with the fuels and moistening themwith alcohol. When it dries it will be in a solid state. I will have to be careful not to move the rocket as it is drying because the fuel might crack and therefore stop combustion at that point.

6/10/63 1:45 PM

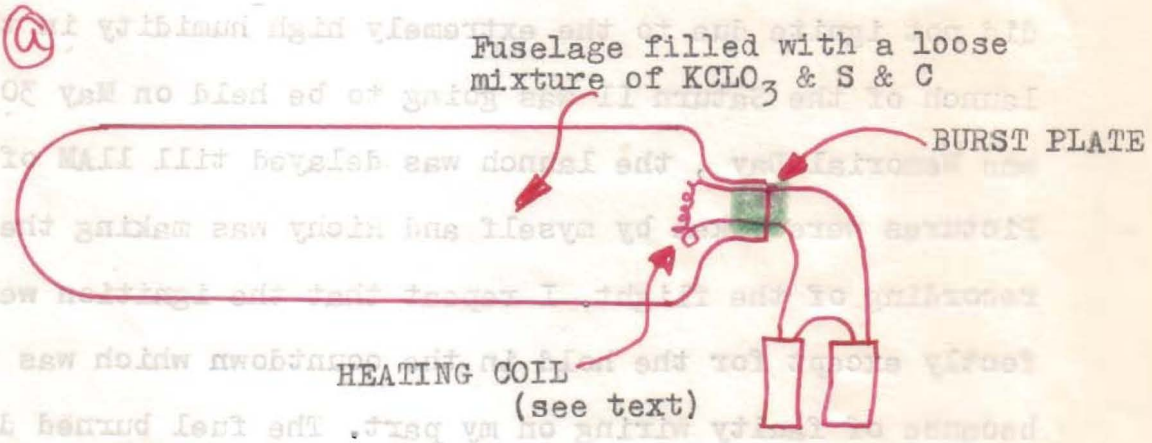
NOTES ON SATURN I_T

On May 30, 1963, at Hells Bells. Ignition was perfect. I used a heating element connected in series with two $1\frac{1}{2}$ volt dry cells. The craft was originally going to be ignited by a magnesium ribbon.

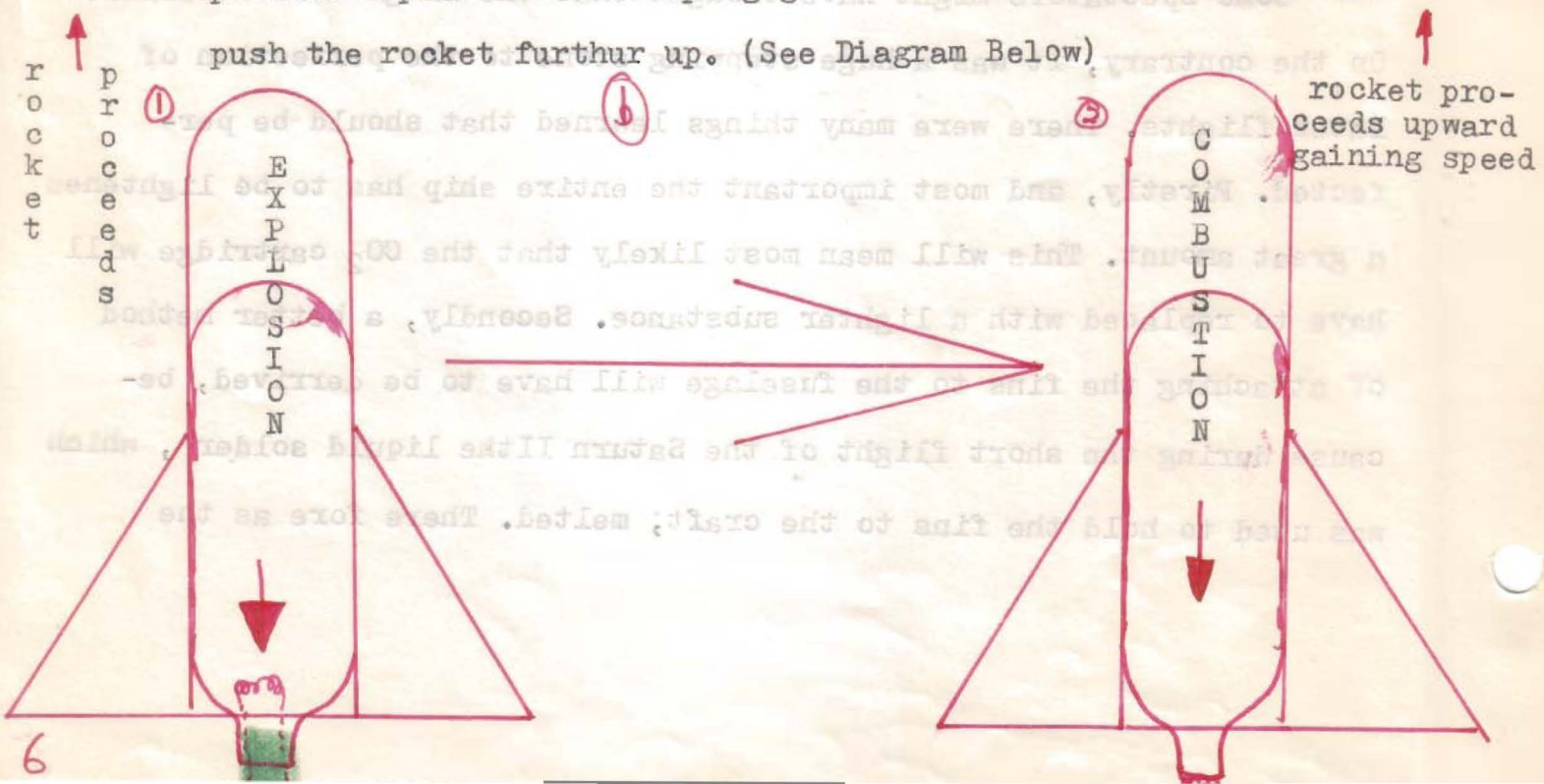
The Saturn I was fired on May 23, 1963, at 4 PM but the rocket did not ignite due to the extremely high humidity in the air. So the launch of the Saturn II was going to be held on May 30, 1963. This was Memorial Day , the launch was delayed till 11AM of that morning. Pictures were taken by myself and Richy was making the tape recording of the flight. I repeat that the ignition went off perfectly except for the hold in the countdown which was imperative because of faulty wiring on my part. The fuel burned down and a cone shaped flame belched out of the nozzle of the CO_2 cartridge. At the very end of combustion there was a small explosion which boosted the Saturn II craft up to a height of 3 feet and then when it reached the summit of its flight the craft plummeted down to the earth.

Some spectators might have thought that the flight was a failure. On the contrary, it was a huge stepping stone to the perfection of later flights. There were many things learned that should be perfected. Firstly, and most important the entire ship has to be lightened a great amount. This will mean most likely that the CO_2 cartridge will have to replaced with a lighter substance. Secondly, a better method of attaching the fins to the fuselage will have to be derrived, because during the short flight of the Saturn IIthe liquid solder , which was used to hold the fins to the craft, melted. There fore as the

rocket fell to the earth the fins became separated from the fuselage. fuselage. I have been working on a new method of fuel consumption because it will be mandatory. In the test flight the fuel was in a solid state , but in the nexttest a fuel in powdered form will be used. (See Diagram Below)



The purpose of the burst plate is to give the rocket the initial boost to ride up into the troposphere. In this way the rockets combustion chamber will develop a small explosion and send the projectile upwards. Now comes the changover. As the rocket proceeds upwards the escaping gases came out of the nozzle and push the rocket furthur up. (See Diagram Below)



Although the fuel consumption will be faster with powdered fuel, more of a thrust will be obtained from the small combustiom chamber. As the craftgoes up the heating element will not slow the craft down. It will slip out after the rockets take-off. So far the Saturn II shot has been a success as far as information gained. My next rocket will be called the Saturn III, it will have all of the new adjustments I found necessary by the information gained.by the Saturn II.

THE SATURN III

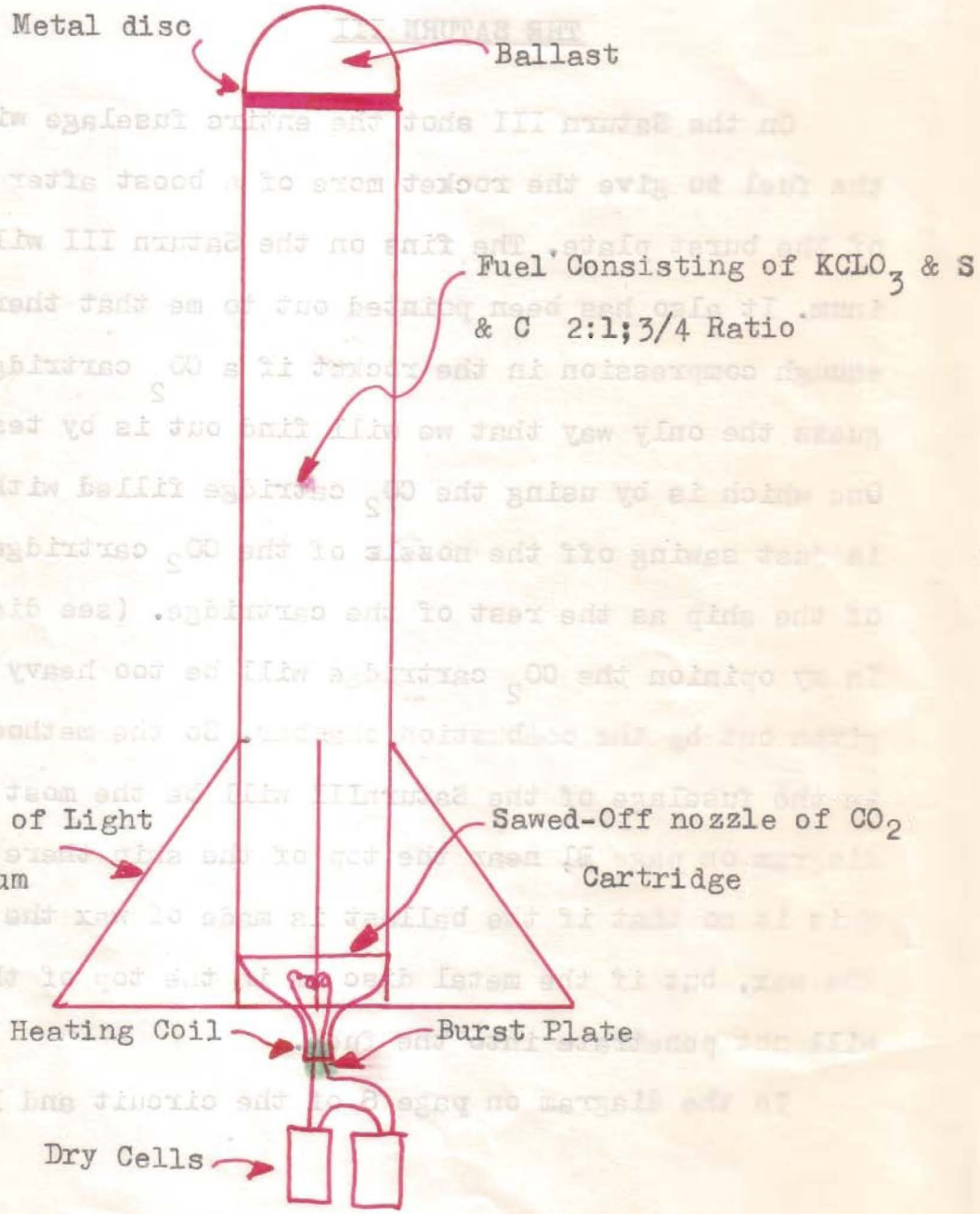
On the Saturn III shot the entire fuselage will be filled with the fuel to give the rocket more of a boost after the first ignition of the burst plate. The fins on the Saturn III will be made of thin aluminum. It also has been pointed out to me that there would not be enough compression in the rocket if a CO_2 cartridgeis not used. I guess the only way that we will find out is by testing both methods. One which is by using the CO_2 catridge filled with the fuel. The other is just sawing off the nozzle of the CO_2 cartridge and use the fuselage of the ship as the rest of the cartridge. (see diagram on page 8) In my opinion the CO_2 cartridge will be too heavy for the thrust given out by the combustion chamber. So the method of putting the fuel in the fuselage of the SaturnIII will be the most effective. In the diagram on page 8, near the top of the ship there is a metal disc. This is so that if the ballast is made of wax the heat will melt the wax, but if the metal disc is in the top of the fuselage the wax will not penetrate into the fuel.

In the diagram on page 6 of the circuit and loading method of the

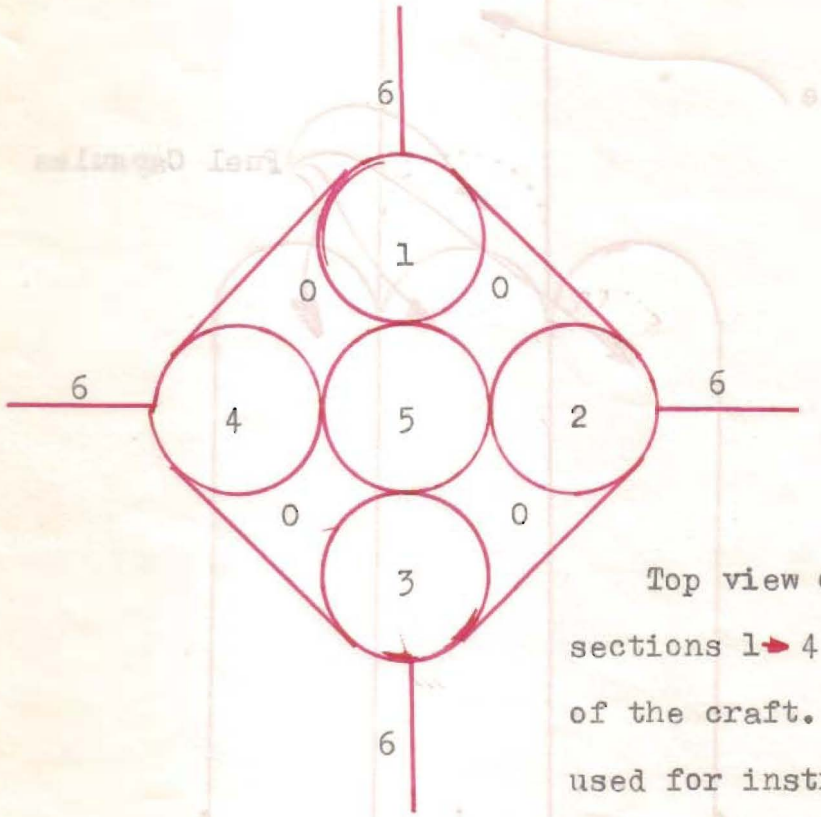
fuel, the fuel is listed as being $KCLO_3$ & C→(Sugar) but I believe that I shall replace the sugar with pure carbon and some sulphur. So now the fuel consists of 2pts $KCLO_3$, 1pt S, & 3/4 pts C.

For now all that is left is to construct the Saturn III with all of the new features and again try to launch the projectile.

PLAN FOR THE SATURN III



FUTURE SATURN ROCKETS



Top view of future rocket the sections 1→4 are the main engines of the craft. Section 5 may be used for instruments. The spaces marked as 0 are empty air pockets. If these were filled in it would slow down the craft because of the blockage of the air coming through. Figure 6 is the tail fins of the craft. (See back of this page for side view of rocket.) A method of fuel ignition will have to be devised so that the 4 sustainer engines fire in unison. If the rockets fire in a equally spaced intervals it will not throw the ship off that much. But if one or two of the sustainer engines do not fire the craft most likely will not rise to its full trojectory. Being that the center fuselage #5 will be higher than the rest of the tanks the fuel tanks will converge a bit so that the 4 exhausts will mix together to

form one flame coming
out of the exhaust.