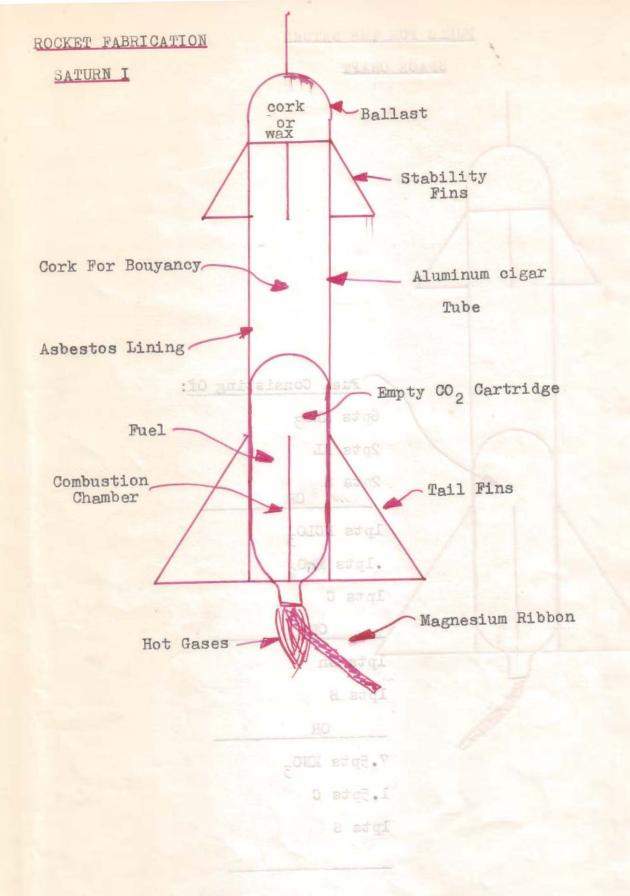
SATURN

EXPERMENTATION

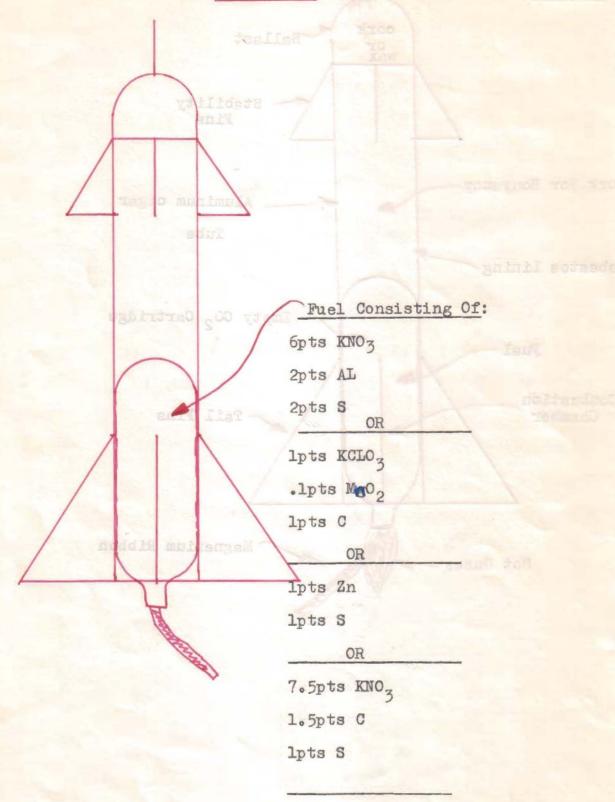
Charles Merguerian Richard J. Vastala

10 June 1963



FUELS FOR THE SATURN

SPACE CRAFT



					TOTAL .	CHICHTE
	Saturn # & Date	Ignition	Take Off	Footage	Time	Remarks
	Saturn I 5/23/63					Magnesium Ribbon was Defective
	Saturn II 5/30/63	perfect	at the end of . combust-ion	3 ft.	llam	
						at teeligd A .teeligd a TC
	.togi	Cl test :	rods spir	waver in	ton	ends that the craft does
	m time	wob tho c	4 fins s	will be	eredi	On the outside of the ship
	7 45 5					.thgill set to gniteve
	(pris.	llows; I	of as our	veril .i	e file	o shabi & test I ibw eV
	.E smal ,	in acul l	II .0 eág	KOLO, I	.atc	MO3, 2pts AL, 2pts S. II i
	- 0	t will be	i no.iniqu	ym mI .	a sit	IV 7.5pts LNO, 1.5pts 0, 1
			45,55	100		tossup between #1 & #3 fuel
(8)	fault	lion sois	m IliwI .	ae zuir in	t ent	nill not try to melt any of
	-91	La mad no	eui edt n	tiw rade	isdo r	by lossing up the combustio
					-	Tening themsith alcohol. Wh
						mili have to be careful m
	20-2	o I TELEMON	dots are	i vheref	sk an	because the fuel sight ora
						.In tog Jada
					4	
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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 KNO3, 2pts AL, 2pts S. II ipts. KCLO3, ipts C. III lpts Zn, lpts S. IV 7.5pts KNO3, 1.5pts C, lpts 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.

NOTES ON SATURN IT

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 llAM 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 CO₂ 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 CO₂ 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. 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)

Fuselage filled with a loose

side . To the mixture of KCLO3 & S & C

BURST PLATE

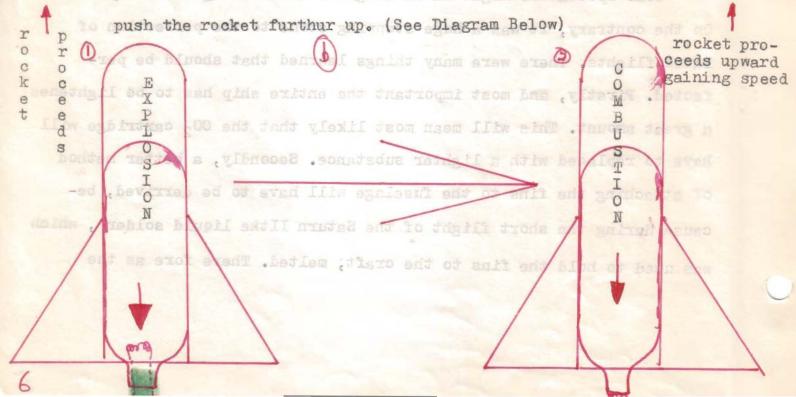
and the little beyslab and high institute of KCLO3 & S & C

BURST PLATE

and the mixture was making the transfer of the first went of the control of

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 further up. (See Diagram Below)

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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 alum inum. It also has been pointed out to me that there would not be enough compression in the rocket if a CO 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, catridge filled with the fuel. The other is just sawing off the nozzle of the CO2 cartridge and use the fuselage of the ship as the rest of the cartridge. (see diagram on page 80 In my opinion the CO 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. - 1100 gaitsen

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

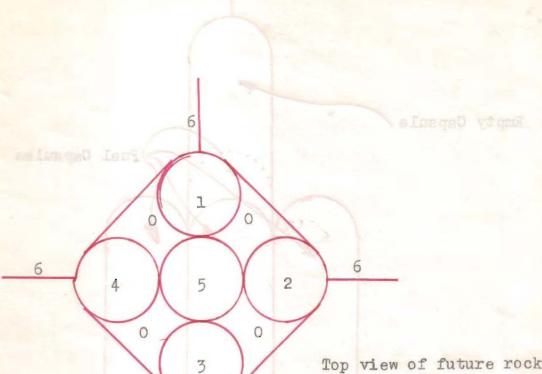
fuel, the fuel is listed as being KCLO₃ & C (Sugar) but I believe that I shall replace the sugar with pure carbon and some sulphur.

So now the fuel consists of 2pts KCLO₃, 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 The man additional to the saturn of the saturn

Metal disc the entire fuselage will be filled attach Jone III market and no not bug ferit end tatle frood . to even tempor end evil ou feri and fine on the Saturn III will be made of no enit Fuel Consisting of KCLO & S inted out to me that there would not be a CC cartridgeis not used. compression in the more the only way that we will find out is by testing both method and which is by using the Cho cetridge filled with the fael. The In the saming off the noss s of the CO cartridge and use the filled of the ship as the rest of the certifice. (see diagram on this to orinion the CO, cartr de will be too heavy for the thrust ine most effective, In the Sawed-Off nozzle of CO2 Fins made of Light Cartridge Aluminum - Lim ILin Jean but x -Burst Plate Heating Coil -Dry Cells6



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. Empty Capsule / Fuel Capsules not tempor erutur to melv got sections le 4 are the main appare of the craft, Section 5 may be used for instruments. The spaces Marked 13 0 are empty six pooling. It wie assessed Jigio wit wood wold alore the heilift of w esself in to entit list ont si d ingil. Figure to the tal fine or conste (See back-of this page for side view of rocket.) A method of Just ignition will have to be devised to that the V sustainer Leonge /Lisupe a ni at ata Antinos Elfa de intervals to will be thrower ship of the mon. But 1 one or two of the enstainer engines do not it to the craft most i kel i return that gried . yrotost tri stint the tor like

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