



RACOL

Rural Advanced Community of Learners

The Infinite Prime

- DESIGN DOC -

Compiled by David Kretz & Luke Ilett

1.1 Requirements:

- Only focus 10-20 minutes of game time for each concept
- Also, the modules need to be able to be played in any order so that the game can facilitate more class plans than just the one given to us.
- Design must have an intuitive UI so that anyone can pick up and use a module within the game.
- Create different levels within the module so that all tiers of learning can be included.
- Use different learning techniques throughout all the modules so that the game does not become monotonous to the degree of boredom.

1.2 Design Decisions:

For use-ability purposes I feel allowing all the physics games to be available from the Opening Menu. That way the game can be used as just a tool for the teachers. This way the teachers can get the students to go directly to a physics concept without having to worry if the student has made it that far in the game yet.

For each concept a mini game or objective will be available. They will all be interactive in a sense that you have to go to a place in the universe to actually accomplish the job at hand. This way the students will at least get to fly or plot a course to a destination; the quicker you get there, the more points you receive. Once the student has reached their destination the missions will enforce a target concept and allow them to play with these concepts as much as possible. They will accomplish missions either through graphing, using equations, or just playing with a theory in real time.

For Example: Once a ship has been selected and bought, it will need to be loaded onto a platform so that takeoff may commence. Using pulley systems the student must calculate the minimum amount of energy needed to lift the ship from the trailer on to the launch platform. Here the student can play with a number of pulleys and place them together to solve the problem. Once they have placed the pulleys they then calculate how much energy is needed to actually lift

the ship. Then calculate the amount of force that is needed to pull the ship into the launch bay. Once they calculate the answer the game then applies the force and the student can visually see if their result was sufficient to complete the task. Rewards are higher the closer you get to the actual answer, since applying more force than needed will lift the ship.

Not every component will be as interactive as the example described above. In some cases the concept will be driven home merely through visual devices such as field theory models. We may need to pull away from some of the hands-on interaction for showing concepts because the actual concept does not fit into a gaming reference. The student still has to get to the given job by flying there, but when they get there it becomes more of a look-and-see type of event. Here a multiple choice Q & A session could be used to test if the student understands a concept to a certain degree.

As I have said before the student must fly through the galaxy to get from job to job and space stations will be located throughout the universe. This is where the actual game play comes into effect. Speed will be an issue and if the student beats the time then they are awarded bonus points. The trick to beating these time laps is to use the gravitational pull of the planets around you to reach speeds unattainable by simple acceleration. So a plotter will be implemented to allow the students to plot their desired flight plan and then watch their ship fly there. Eventually, top speeds and best times may be displayed online.

1.3 GAME STORY

The year is 2182 and you have been accepted into solar transits space academy program,

A rare opportunity to experience life in outer space, while being trained as a transporter for the galaxy. Using your physics knowledge to move through your training you eventually start work for Solar Transit, but as you're completing missions across the galaxy you become suspicious of certain behavior of other ships and people around you. Your complaints are brushed off and you decide to investigate things for your self. When transporting some political figures to a location you over hear a conversation that leads you to uncover a space conspiracy that results in the creation of a super

weapon. You must to use your wits and physics knowledge to the stop mass destruction that could follow.

1.4 GAME OBJECT DESCRIPTIONS AND TABLES

- ITEM TEMPLATE -

NAME	Item Name	INDEX
DESCRIPTION:		
Item Description		

DESCRIPTIONS:

NAME	Engine (100 km / h)	INDEX
DESCRIPTION:		
Tuned your engine, 100 km/h was added to your max acceleration		

NAME	Engine (500)	INDEX
DESCRIPTION:		
Tuned your engine, 500 km / h was added to your max acceleration		

NAME	Engine (1000 km / h)	INDEX
DESCRIPTION:		
Tuned your engine, 1000 km / h was added to your max acceleration		

NAME	Engine (5000 km / h)	INDEX
DESCRIPTION:		
Tuned your engine, 5000 km / h was added to your max acceleration		

NAME	Rate of Acceleration (2)	INDEX
DESCRIPTION:		
Tuned your engine, 2 km / h was added to your rate of acceleration		

NAME	Rate of Acceleration (7)	INDEX
DESCRIPTION:		
Tuned your engine, 7 was added to your rate of acceleration		

NAME	Rate of Acceleration (10)	INDEX
DESCRIPTION:		
Tuned your engine, 10 was added to your rate of acceleration		

NAME	Cash (100)	INDEX
DESCRIPTION:		
your engine, 100 was added to your rate of acceleration		

NAME	Cash (1000)	INDEX
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DESCRIPTION:	
your engine, 1000 was added to your rate of acceleration	

NAME	Cash (3000)	INDEX
DESCRIPTION:		
your engine, 3000 was added to your rate of acceleration		

NAME	Full Refuel	INDEX
DESCRIPTION:		
Filled your gas tank up		

NAME	Max Fuel (100)	INDEX
DESCRIPTION:		
You gained a new fuel tank, 100 was added to max fuel		

NAME	Max Fuel (200)	INDEX
DESCRIPTION:		
You gained a new fuel tank, 200 was added to max fuel		

NAME	Fuel Economy (0.01)	INDEX
DESCRIPTION:		
Your fuel economy has been improved		

NAME	Fuel Economy (0.02)	INDEX
DESCRIPTION:		
Your fuel economy has been improved		

NAME	Time Trophy	INDEX
DESCRIPTION:		
Golden Trophy for beating the time trial		

NAME	Pilot's License	INDEX
DESCRIPTION:		
CERTIFIED LICENSE: You must have your license on you at all times while piloting a space ship		

NAME	Gas Can	INDEX
DESCRIPTION:		
Hold 50 Liters of Gas - Filler up!!		

NAME	Energy Capsule(10)	INDEX
DESCRIPTION:		
Used in many different aspects of the Infinite Prime. These capsules allow certain pieces of equipment to function properly. Keep lots of these around incase you find yourself lost in space.		

NAME	Passport	INDEX
DESCRIPTION:		
Entitles you enter the "STATION NAME HERE" . Without this passport you wont		

be allowed on the station

NAME	Time Shifter	INDEX
DESCRIPTION:		
<p>Having being lost a decade ago this item has the ability to change the speed of time. It harnesses light and allows it travel faster or slower through a vacuum. Don't sell this item because it will cost you more than what you sold it for to acquire it back.</p>		

NAME	Ship Companion	INDEX
DESCRIPTION:		
<p>Adjust certain properties of your ship to make it easier to maneuver around the solar system. You can change MAX ACCELERATION and RATE OF ACCELERATION and when selected as item your current item in use you can refuel your ship or re-energize you shields at the click of a button. Ah the benefits of modern technology.</p>		

NAME	Worm Holer	INDEX
DESCRIPTION:		
<p>Through means of science the Space Academy has developed a new mode of transportation. Using the sub-string theory, scientists have been able to bend space time onto itself allowing ships to travel across the span of our solar system in mere seconds. Although it many potentials this device uses a lot of energy to work its magic. Make sure you have lots of energy capsules before you start using it.</p>		

NAME	De-cloaking Device	INDEX
DESCRIPTION:		
<p>Unbeknownst to the human race until recently, the decloaking device can reveal hidden places from millenniums past. Follow clues you find along you travels to reach secret places within and far beyond our solar system.</p>		

NAME	Pool Table	INDEX
DESCRIPTION:		
<p>Exactly what it is. If you can get a Pool Cue and a pool table you can travel the solar system in search of the ultimate pool players and win some heavy cash.</p>		

NAME	Pool Cue	INDEX
DESCRIPTION:		
<p>Exactly what it is. If you can get a Pool Table and a pool table you can travel the solar system in search of the ultimate pool players and win some heavy cash.</p>		

NAME	Pool Cue	INDEX
DESCRIPTION:		
<p>Exactly what it is. If you can get a Pool Table and a pool table you can travel the</p>		

solar system in search of the ultimate pool players and win some heavy cash.

NAME	Oil Can	INDEX
DESCRIPTION:		
The oilcan can bring life back to your ship. Use this to fill up your life meter by 50 HP		

NAME	Aptitude Medal	INDEX
DESCRIPTION:		
A flying Aptitude Medal. You should be proud of owning this it signifies a excellent driver with regards to speed an accuracy.		

1.5 ITEM QUICK REFERENCE:

NAME	INDEX
Engine (100)	0
Engine (500)	1
Engine (1000)	2
Engine (5000)	3
Rate of Acceleration (2)	4
Rate of Acceleration (7)	5
Rate of Acceleration (10)	6
Cash (100)	7
Cash (500)	8
Cash (1000)	9
Cash (3000)	10
Full Refuel	11
Max Fuel (100)	12
Max Fuel (200)	13
Fuel Economy (0.01)	14
Fuel Economy (0.02)	15
Time Trophy	16
Pilot's License	17
Gas Can	18
Energy Capsule(10)	19
Passport	20
Time Shifter	21
Ship Companion	22
Worm Hole	23
De-Cloaking Device	24
Pool Table	25
Pool Cue	26
Oil Can	27
Aptitude Medal	28

1.6 JOBS – Game Play related Elements

JOB TYPE SHORT FORMS:

Movie Clip	MC
Graph	GR
Question and Answer	QA
Delivery	DE
Retrieval	RE

- JOB TEMPLATE -

NAME: Name of Job - JOBTYPE	ShortForm
TOPIC: A brief explanation of the physical topic covered	
STATION: Station where the job is located (short form)	
O-TEXT: Text is displayed when this job has been selected from the menu	
C-TEXT: Text is displayed once a job has been completed	

NAME: First Flight - DE	FF
TOPIC: Gaming job	
STATION: SA	
O-TEXT: So, you want to be a space pilot eh? Well, you have to show us some basic flying skills before we give you any job. All you have to do is fly back to the Space Academy. Sounds easy enough you say... we'll see !.	
C-TEXT: Very good, there is two more jobs to complete before you become a fully fledged pilot. You need to demonstrate your aptitude in math and graphing to get your license.	

NAME: Obtaining Your License - GR	OYL
TOPIC: Change in the position and velocity of objects and systems can be described graphically.	
STATION: SA	
O-TEXT: To prove your flying aptitude you are going to have to graph your ships ACCELERATION over TIME. Your going to need to get your acceleration over 400 m/s ² in less than 20 s. You shouldn't have any trouble with the new Med Spec Engine we installed on you ship.	
C-TEXT: Great Job, you have become a pilot!! Here are your certificates and some upgrades for your ship to help you on your way. You can check how many items you have collected for use by pressing U.	

NAME: Helping with the flow - DE	HWF
TOPIC: A brief explanation of the physical topic covered	
STATION: SA	
O-TEXT: We have designed a new transmitter that uses light to send information through space. The commander at Karnuga Station has offered his aid in testing out the new device. Could you run this one over to him so we can calibrate it. ?	
C-TEXT: Thank you. We will begin to calibrate the device immediately. I hear this little transmitter could change the way we communicate over large distances. They seem quite optimistic over their at the space academy but if you ask me most of the stuff they make is useless !	

NAME: Interesting Properties - GR	IP
TOPIC: Graphing assignment	
STATION: KS	
O-TEXT: We have been watching you fly and I have to tell you you're ship is looking very good. Me an some of the other officers have pooled some money together and a willing to give it to you if you can travel 80000 km in less than 60 seconds. Your going to have to graph the data from your ships read-out to prove it to us.	
C-TEXT: Awesome ! That was really cool to see from inside the station. As promised here is you money. I'd pay to see that again.	

NAME: Repair the Shields - RE	RTS
TOPIC: Gaming job	
STATION: SA	
O-TEXT: Hey, so you're the new recruit. Well our shields seem to be malfunctioning and we need a new processing matrix to stabilize them.	
C-TEXT: Great job, and just in the nick of time. We have picked up a meteor shower headed towards each directly in our path. Please take these items for completing the task.	

NAME: Emergency at Space Academy - RE	ESA
TOPIC: Gaming Job	
STATION: CRM	
O-TEXT: The Space Academy has had a fire and until they get the essential supplies from Karnuga Station they might end up a floating ball of torched plastic and metal. Go to Karnuga Station to grab the supplies and then head to the Space Academy as fast as you can.	
C-TEXT: We were in real need of these supplies. Some of the fires have spread to common areas. We should be able to extinguish them now for good.	

NAME: Worth Your Time - DE	WYT
TOPIC: Gaming Job	
STATION: KS	
O-TEXT: There has been a power outage at the Outlying Refuel and they need a shipment of blankets as soon as possible. They say the faster the better...	
C-TEXT: Blankets are here! Let's move these over with the block heaters and get the supplies to those who need them most.	

NAME: Quest for Knowledge (Scientific Notation) - QA	QK1
TOPIC: Scientific Notation	
STATION: SA	
O-TEXT: First test of many you will encounter along your travels. The Space Academy has agents all over the solar system that are ready to keep cadets like you on your toes. As your ship gets better, you can earn better special items from completing these Quests of Knowledge!	
C-TEXT: Excellent job you've completed your first quiz. There are many more along your travels but you have proven yourself here today!! Good Luck Cadet.	

NAME: Ruler-less Graphing - GR	RLG
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TOPIC: Intro to graphing tool and basic graphing
STATION: SA
O-TEXT: First test of many you will encounter along your travels. The Space Academy has agents all over the solar system that are ready to keep cadets like you on your toes. As your ship gets better, you can earn better special items from completing these graphing assignments
C-TEXT: Excellent job you've completed your first graph. There are many more along your travels but you have proven yourself here today!! Good Luck Cadet.

NAME: Acting on Impulse – MC	AOI
TOPIC: Impulse and	
STATION: SA	
O-TEXT: We have invented a new ship and need to calibrate the landing gear correctly to fit its landing pattern. We hear you've been studying impulse and its effects on objects. Please come with me to the labs landing simulator.	
C-TEXT: Good job you correctly adjusted the landing gear.	
ITEMS: Items received from completing the job	
SCENE: The movie clip will take place in a lab with a landing simulator. The gear should look like a tripod and have a dummy weight in the center of them. It is then dropped from a height h and based on the answer give by the student. The solution will either be too much force or too little force	

NAME: Calculating Exhaust Speed– MC	CES
TOPIC: Momentum and conservation of energy	
STATION: CRM	
O-TEXT: We would like to you run a diagnostic on your engines exhaust speed. We think we may have found a better way to burn your fuel but need something to compare our data too.	
C-TEXT: Excellent work! We have compared the results of your efforts and have confirmed what we thought. Our new engine prototype will propel you faster through the void of space. You are definitely a valuable resource to our team.	
SCENE: This scene can be set up with just a space back ground. We will need a piece of equipment in the middle of the scene which is holding the users ship. Then an accelerometer to measure the velocity of the ship.	

NAME: Describing Momentum – MC	DEM
TOPIC: Solving for the law of conservation of momentum	
STATION: CRM	
O-TEXT: Its time to test your wits with this problem. We know that the law of conservation of momentum is, how did we arise to this equality. Its just one of those things a space pilot needs to know.	
C-TEXT: Excellent you've received some energy capsules to aid you on your travels.	
SCENE: No scene – this problem takes place on the screen using an equation scrambler. Something I'll have to work out along the way.	

NAME: Pool Anyone? – MC	POA
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TOPIC: Elastic Collision Problems
STATION: OC
O-TEXT: You've spied an old pool table in the back of the stations game room. It doesn't seem to be used very much so you ask the room's owner if he would like to sell and he says he'll give you it if you answer some questions about it.
C-TEXT: You now have a pool table in your collection. From time to time you will have a chance to play pool against some of the greatest in the galaxy. Keep an eye out for Want To Have a Game jobs at other stations. You get great items for beating the station champions.
SCENE: Pool Table

NAME: Newton's Laws of Motion – QA	QK2
TOPIC: Newton's Laws of Motion	
STATION: KS	
O-TEXT: What is knowledge? Does it have a definite description or is it ever changing, evolving and growing as the world grows? The Quests of Knowledge are presented to you to show that you understand and can apply knowledge about key concepts in Physics.	
C-TEXT: Another one completed. You are definitely gaining experience in the field of Physic. Keep up the good work!!	

NAME: Newton Applied 1 – QA	NA1
TOPIC: Problems related to Newton's Laws of Motion	
STATION: KS	
O-TEXT: What is knowledge? Does it have a definite description or is it ever changing, evolving and growing as the world grows? The Quests of Knowledge are presented to you to show that you understand and can apply knowledge about key concepts in Physics.	
C-TEXT: Another one completed. You are definitely gaining experience in the field of Physic. Keep up the good work!!	

NAME: Newton Applied 2– QA	NA2
TOPIC: Problems related to Newton's Laws of Motion	
STATION: KS	
O-TEXT: What is knowledge? Does it have a definite description or is it ever changing, evolving and growing as the world grows? The Quests of Knowledge are presented to you to show that you understand and can apply knowledge about key concepts in Physics.	
C-TEXT: Another one completed. You are definitely gaining experience in the field of Physic. Keep up the good work!!	

NAME: Quest For Knowledge (Collisions)– QA	QK3
TOPIC: Elastic and Inelastic Collisions	



STATION: OC
O-TEXT: What is knowledge? Does it have a definite description or is it ever changing, evolving and growing as the world grows? The Quests of Knowledge are presented to you to show that you understand and can apply knowledge about key concepts in Physics.
C-TEXT: Another one completed. You are definitely gaining experience in the field of Physic. Keep up the good work!!

NAME: Chalking your Cue- MC	CYC
TOPIC: Collisions in 2D	
STATION: OC	
O-TEXT: Well you got yourself a pool table but you're going to need a cue to start playing. We love to let you buy one but you need to show us some basic knowledge about pool and the collisions that take place.	
C-TEXT: Good work here is the table, you've earned it fair and square.	
SCENE: Pool Table	

NAME Returning A Favor - DE	DE1
TOPIC: Game Related	
STATION: SA	
O-TEXT: Interestingly enough about a week ago I borrowed a digital analyzer from the onboard scientist at Karnuga Station. Could you return it to him?	
C-TEXT: My analyzer!! Thanks I was running into so problems without it. You don't know how important this is to stations well being. Give my regards to the Professor.	

NAME: Contents May Explode - DE	DE2
TOPIC: Game Related	
STATION: CMR	
O-TEXT: We found an old alien artifact. Could you transport it to the Space Academy for analyzing.. we think it has the power to speed up time, but we have been advised to discontinue our testing. Heresay is if you use the artifact incorrectly it will explode !	
C-TEXT: Ah the artifact has arrived. We are very interested in its properties. We are hoping to control its power so that time travel will be a reality.	

NAME Mail Run - DE	DE3
TOPIC: Game Related	
STATION: KS	
O-TEXT: The regular postal ship has broken down and we haven't been sending Central Refuel and Maintenance their mail for the last 2 weeks. So we need you to run the mail bags over.	
C-TEXT: Hey the mail is finally here. Oh a parcel for me? You don't say! Well let's see what it is. It's cookies from grandma. Hey look everyone look, it's cookies from grandma!	

NAME: Command Decision - DE	RE
TOPIC: Game Related	

STATION: OMR
O-TEXT: We have just received a distress call from Central Refuel. Their power supply has been hi-jacked. They were running on back-up power when we were contacted and have received minor damages. Please hurry to the Space Academy and grab a power supply from them and bring it to Central Refuel.
C-TEXT: So what is going to be done about this thievery. We we're boarded late at night and then put in the infirmary while they took our power source. What could they want with it?

NAME: Special Delivery - DE	DE5
TOPIC: Game Related	
STATION: OC	
O-TEXT: When you get back to the Space Academy could you give this note to the professor. We are under suspicion that some of the crew at Karnuga Station are working for fugitive. Have you heard anything? Anyway it's very important you get this to the professor	
C-TEXT: Oh my !! This is not good. I may need to call on your services in the near future. It seems someone has released information regarding the where about' of the time shifter. After you brought us the item we did some preliminary tests and then sent it to secret hideaway. Only two people know its location, myself, and the captain of Karnuga Station.	

NAME: Colonization Request 1 - DE	PO1
TOPIC: Game Related	
STATION: SA	
O-TEXT: A maintenance crew has come from Earth's surface to begin the needed work on the Outlying Colony. Would you bring them to their new home. The next time we meet the rest of the crew and habitants will be waiting to go.	
C-TEXT: Well the station seems to be in working condition. We will be awaiting the rest of the crew on your return. By then we should have basic quarters built.	

NAME: Colonization Request 2 - DE	PO2
TOPIC: Game Related	
STATION: SA	
O-TEXT: The remaining crew and habitants for the Outlying Colony have arrived and are awaiting departure. Please come back as soon as possible as I have a very dangerous mission for you.	
C-TEXT: The final crew and habitants. We have been awaiting them. We still have much work to do here but your aid has helped very much. I hope to see you soon with supplies. The skeleton crew at the Outlying Refuel is due for transfer. Go to the Central Refuel where a new crew is ready to get started.	

1.7 JOB TYPE DISTRIBUTION:

*'s will be completed **only** after everything not *'d is finished



MC	GR	QA	DE	RE	
DEM	RLG	QK1	FF	RTS	
CES	OYL	QK2	HWF	ESA	
AOI	IP	QK3	WYT		
NA1			DE1		
NA2			DE2		
POA *			DE3		
CYC *			DE4		
			DE5		
			PO1		
			PO2		
7	2	4	10	2	TOTAL 25

1.8 Station Description and Locations

-TEMPLATE-

NAME:	Name of station	<i>Short Form</i>
ORBITTING:	If -1 then not orbiting else orbiting planet (see Celestial Table)	

NAME:	The Space Academy	SA
ORBITTING:	2	

NAME:	Karnuga Station	KS
ORBITTING:	2	

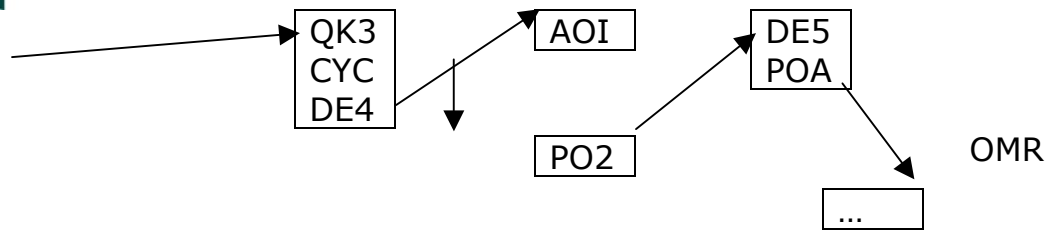
NAME:	Central Refuel & Maintenance	CRM
ORBITTING:	2	

NAME:	Outlying Colony	OC
ORBITTING:	2	

NAME:	Outlying Refuel & Maintenance	ORM
ORBITTING:	2	

Celestial Table

NAME	INDEX	ORBIT
SUN	0	NA
MARS	1	0
EARTH	2	0
VENUS	3	0
NEPTUNE	4	0
PLUTO	5	0



1.10 JOB ACTIVATION CHART

JOBS COMPLETED	JOBS ACTIVATED
FF, QK1, RLG	OYL
OYL	HWF,DE1,WYT,QK3,NA1,DEM,CES
DEM,CES	DE2, ESA
WYT,QK3,NA1	NA2,DE3,IP
DE2,ESA,NA2,DE3,IP	RTS
RTS	PO1
PO1	QK4, CYC, DE4
QK4, CYC, DE4	AOI
AOI	PO2
PO2	DE5, POA
DE5, POA	...

1.11 Art / Sound Assets:

ART: 300 x 300

DESCRIPTION:	DONE
Refuel / Maintenance Station	X
Ship Render	X
Comet / Meteor	X
Space Hotel	X
Secret Space Hideout	X

ART: 30 x 30 (icons)

DESCRIPTION:	DONE
Time Trophy	X
Pilot's License	X
Gas Can	X
Energy Capsule	X
Space Academy Passport	X
Karnuga Passport	X
Outlying Passport	X
Time Shifter	X
Ship Companion	X
Worm Hole	X
Clue Icon	X

Decloaker	X
Pool Table	X
Pool Cue	X

SOUNDS:

DESCRIPTION:	DONE
Click on Icon	
Sliding Menu	X
Clicking on a station	
Click on Job	
Engine Thrusters	X
Shields turning on	
Shields turning off	
Grapher: Make Dot	
Grapher: Erase Dot	
Quit Job	
Job Completed	
Job Accepted	
Coming Near a Planet (Sonar Blip)	
Coming Near a Sation (Sonar Blip)	
Air compressors	

Animations:

* all animations saved as .tif with transparencies

DESCRIPTION:	DONE
NAME: ship00.tif Top Down Shot of the ship The ship needs to be centered in a 300 x 300 pixel image	X
NAME: exhaust0.tif Exhaust coming from the back of the ship 8 frame	X
NAME: shields0.tif Energy Shield turning on then to shields turning off Make the animation 16 frames	X
NAME: burnup.tif With atmospheric burn-up happening The burn-up needs to go from nothing to light burn- up to	X



1.12 Story Line:

CUT SCENES:

1. Opening scene of you taking a rocket from earth the Space Academy
2. A short scene with you receiving your license
3. Taxing delegates you over hear a conversation about world domination
4. Coming across an unmarked ship in the outer regions
5. Gaining and Losing trust from different stations
6. Clues start to pop up while completing missions
7. You find out the location of evils secret base
8. Receive the de-cloaking device from using clues
9. De-cloaking of secret base
10. Saving the world but evil gets away



That pretty much plays out the story for this issue of the game. Luke and I have talked about tying the story with the jobs. I've left some of the jobs descriptions and scenes empty to allow for this process. Keep in mind this doc is not final and is subject to change.