AD LUNAM PLUS

Welcome to AD LUNAM PLUS, a simulation/management game for the 128K ZX Spectrum. You are put in charge of the space program of either the United States or the Soviet Union. It is the spring of 1956 and your aim is to send a crew of your country on the Moon and make it return safely back to the Earth within twenty years.

Each year, you are allocated an amount of funds. These will be needed to research and build equipment, spacecraft and facilities and recruit and train pilots. Expenses will be higher as the space program goes on, so you will need to receive more funds. The only way to increase the yearly fund amount is to increase your prestige. This can be done by completing research on new technologies and, especially, performing successful missions. Malfunctions and failures, as well as lack of progress and "milestones" reached by your opponents, will decrease your prestige instead.

Choose your country

At game start, you have to choose the country you wish to work for, between the United Stated and the Soviet Union. Press "1" for the former and "2" for the latter.

Differences in gameplay are mainly related to the spacecraft/equipment. Generally speaking, American ones are more expensive but also more reliable (at least on paper!), and their rockets are less powerful than those of their counterpart. Soviet rockets have a higher payload but their spacecraft tend to be heavier and less reliable than American ones, and need more testing "on the field" as a result.

Choose the difficulty level

After that, you have to choose a difficulty level. Press "1" for Easy, "2" for Medium and "3" for Hard. Your choice influences several parameters, like the quantity of initially available funds, your initial prestige, the funds allocation coefficient, the penalty for "milestone" missions not carried out, and more.

Main menu

The game time is divided in turns of three months each. During each turn you are able, most of the times as long as you have the funds to do it, to perform various actions. All of them are accessed through the main menu. Here, as in many of the game's other sections, you will be presented a list of options. Press the number corresponding to the desired option to select it.

If you are required to choose a particular item, for instance a spacecraft you want to fly, or a pilot you wish to train, a prompt will appear. Type the desired number and then press ENTER, or DELETE in case you want to modify your choice.

Information

Shows the current funds and prestige and a record of your missions, including milestones (see "Missions").

R&D

Research and development of new equipment/spacecraft. To start a research program, you must have the funds to pay for the prototype and for at least one technician. Building a prototype is more expensive than ordering an already, even not fully, researched equipment/spacecraft. Programs are (American/Soviet):

Satellites/probe:
- Earth orbit satellite (Explorer/Sputnik)
- Lunar orbit satellite (Ranger/Kosmos)
- Lunar probe (Surveyor/Lunik)

Manned spacecraft:
- 1-seat capsule (Mercury/Vostok); can only fly in Earth orbit
- 2-seat capsule (Gemini/Voskhod); can carry a 1-seat lunar module to the Moon
- 3-seat capsule (Apollo/Soyuz); can carry a 2-seat lunar module to the Moon
- 3-seat reusable mini-shuttle (XMS-2/Spiral); can carry a 2-seat lunar module to the Moon; can be relaunched if not heavily damaged during a mission
- 4-seat lunar craft (Jupiter/LK-700); lands directly on the Moon; needs a super carrier rocket

Lunar modules:
- 1-seat LM (LM-1/LK)
- 2-seat LM (LEM/LEK)

Rockets:
- Light (Atlas/R7): a low-cost carrier for lighter spacecraft
- Medium (Titan/11A511): a medium carrier which can carry a manned capsule
- Heavy (Saturn V/N1): a carrier with a large payload, suitable for lunar missions
- Super (Nova/UR-700): the most powerful and expensive rocket, needed to send a lunar craft to the Moon
- Booster/Auxiliary stage: can be attached to a medium carrier rocket, in order to increase the payload and/or make it able to reach the Moon

Other:
- EVA suit: needed for space walks and manned lunar missions
- Service modules A/B: must be attached to 2/3-seat capsules on lunar missions
- Docking module: needed to connect a lunar module to another spacecraft

Equipment/spacecraft have the following specifications:
- Initial cost for the prototype: payed only at project start; produces a usable and researchable prototype
- Cost per unit: payed for every unit manufactured
- Cost per technician: how much should you pay each technician working on the project
- Maximum percentage of efficiency reachable through R&D only
- Maximum percentage of efficiency reachable at all
- Mass
- Quantity in stores
- Current R&D percentage
- Current efficiency percentage

Rockets have a further specification:
- Payload: the maximum total mass that it can carry

To research and develop a new equipment/spacecraft, choose it first, then choose how many technicians

you want to work on this project for the current turn. You can only reach a certain maximum percentage of efficiency through R&D. To further increase the efficiency to the maximum available for that equipment/spacecraft, you must employ it in an actual mission.

Capsules and rockets may take advantage of a %20 bonus to R&D when a spacecraft is researched starting from zero and the previous model has been fully researched. For instance, if the maximum R&D for the 1-seat capsule has been reached and research for the 2-seat capsule begins, the R&D for the latter will start at 20%.

Stores

Visualize your equipment/spacecraft and order new ones, provided that you have researched them first, even not to the maximum.

Press "1" to see a list. Numbers on the right indicate the quantity, prototype cost, cost per unit and current efficiency percentage of each one of them. You can also see the current amount of funds. Press "2" to see your current orders.

In the list screen, press "1" to order a piece. Choose the number on the left of the equipment/spacecraft's name and then confirm your order, or cancel it if you want to, by pressing "1" or "0" respectively.

Pilots

Pilots (called "astronauts" by the Americans and "cosmonauts" by the Soviets) are needed for manned flights. There are a total of ten pilots available. They are recruited in groups of five at a time and must be trained before being sent into space. You can train a pilot in one ability only for every training session. Abilities are divided into basic and advanced and need a basic and advanced training center respectively. A basic training facility is already available at game start.

Basic abilities:
  - Base piloting (BP): needed for earth orbit mission
  - Extra-vehicular activity (EV): needed for every kind of EVA
  - Docking (DO): needed for lunar missions with docking modules

Advanced abilities:
  - Advanced piloting (AP): needed for lunar missions
  - Endurance (EN): needed for lunar missions

The status (ST) can be one of the following:
  - A: Available
  - T: Under training
  - M: Chosen for a mission
  - I: Injured

Deceased pilots are not shown on the list.

Pilots need three turns for basic training and five for advanced training. An injured pilot will need two turns to fully recover.

Abilities are expressed by a number going from 1 (worst) to 9 (best). An ability can be trained multiple times until it reaches the maximum.

Facilities

Facilities are needed to perform certain tasks. On selecting this option, you will be presented a list of facilities, together with their status. If a facility has not yet been built, its cost is shown instead. Enter the number of the facility you wish to build and, if you have enough funds, you will be shown the number of turns necessary to build it. Press "1" to confirm or "0" to cancel.

Launch pads will let you launch rockets. You can have a maximum of three; one is already built at game start. If you have at least one launch pad available, you can allocate it to a mission. They are always chosen automatically according to their status. E.g. if you have two launch pads and launch pad 1 is unavailable, you can always plan a new mission, which will start from launch pad 2. If a rocket or booster explodes during liftoff the launch pad will be damaged and will be restored in two turns.

Training facilities are needed in order to train your pilots. A basic one is already available at game start. You must build an advanced facility in order to train advanced abilities as well.

Assembling facilities put everything needed for each mission together. A facility for small/medium spacecraft and rockets is already available at game start. A large assembling facility is necessary to employ heavy and super carrier rockets, and/or for lunar missions.

Laboratories conduct research. Advanced spacecraft – lunar modules, shuttle, lunar craft – require an advanced lab to be researched. The advanced labs will also provide a small bonus to your research, as if you had one free technician in addition to those you assign to each project.

Missions

Here you can plan a new mission and review your scheduled ones. You can only plan a new mission if there is at least one launch pad available. Scheduled missions will be carried out at the end of the turn.

Press "1" to plan a new mission. You must specify:
- which spacecraft you want to fly;
- your destination;
- the rocket carrier you wish to use, and if you wish to add boosters/auxiliary stages;
- if the spacecraft can be manned (except for 1-seat capsules) and your destination is not a Moon landing, you will be asked if you wish to perform an EVA. If yes, an EVA suit will be added to the equipment for the mission. 1-seat capsules do not allow for EVAs, while moon landing missions always require one or two EVA suits;
- again, if the spacecraft can be manned, you will be asked if you wish to add a crew. Manned spacecraft can be remote controlled for testing purposes, but you must actually send people on the Moon to win the game! Select your pilots, provided they are available and have been trained accordingly.

Some missions are marked as "milestones". They will give you a prestige bonus if you accomplish them before your opponents, while if the other side manages to complete them before you, your prestige will decrease. Each one of them will also give an efficiency penalty, based upon the difficulty level you chose at the start, to your mission, if you do not achieve them in that order before attempting a more complex

mission. For instance, if you attempt to send a satellite in lunar orbit without performing all of the three previous missions, you will suffer an efficiency penalty, at Medium level, of -6% per mission, so -6 × 3 = -18%. Milestones are:

- Artificial satellite in Earth orbit
- Manned Earth orbital flight
- Extra-vehicular activity (EVA) in Earth orbit
- Artificial satellite in lunar orbit
- Probe landing on the Moon
- Manned lunar orbit flight

There are several ways to send a crew on the Moon. It is up to you to decide which one you would like to follow, according to your funds, the missions you have completed so far, your opponents' situation etc.:

- 2-seat capsule with 1-seat lunar module, carried by a heavy rocket; drops the module on the Moon surface, then docks with it later in Moon orbit to return to Earth (this was the Soviet historical approach);
- 3-seat capsule with 2-seat lunar module, carried by a heavy rocket; drops the module on the Moon surface, then docks with it later in Moon orbit to return to Earth (this was the American historical approach);
- reusable mini-shuttle with 2-seat lunar module, carried by a heavy or super rocket; drops the module on the Moon surface, then docks with it later in Moon orbit to return to Earth;
- lunar craft, carried by a super rocket, landing on the Moon and lifting off from it to return to Earth.

Abilities needed for each mission (between parenthesis, how many pilots must be trained in it):

Earth orbit	Base piloting (all)
Moon orbit	Advanced piloting/Endurance (all)
EVA in Earth/Moon orbit	EVA (at least 1)
Moon landing (1-seat lunar module)	EVA (at least 1)/Docking/Advanced piloting/Endurance (all)
Moon landing (2-seat lunar module)	EVA (at least 2)/Docking/Advanced piloting/Endurance (all)
Moon landing (lunar vehicle)	EVA (at least 2)/Advanced piloting/Endurance (all)

Save/Load

You can save the game state on tape and load it at a later time. To record the current state, insert a tape in your tape recorder, press REC and PLAY on it and then choose Save. To load it back, insert the tape you previously saved the game state on, press PLAY on your tape recorder and then choose Load. After both operations, the game will go back to the main menu. At that time, stop the tape.

End turn

Ends the current turn and carries out the scheduled missions, if any.

For each mission, you will have to press a key in the mission control screen as every step is reached. Each mission is composed by a variable number of steps, from a simple Earth orbit satellite launch, to the manned lunar landing mission. If everything goes right, the equipment/spacecraft employed will increase its efficiency of a further 2%, until the maximum is reached. Your prestige will also increase.

Should there be any problems during the flight, they can be more or less serious, depending from the efficiency percentage of the affected equipment/spacecraft. Higher percentages will decrease the chances of malfunctions. If the flight is manned, your pilot(s)'s abilities could also help preventing malfunctions. For instance, a pilot with a high capsule piloting skills can avert a problem with his spacecraft, or make it less serious. In this case you will have the choice to carry on with the mission, at the cost of a slight decrease in the affected equipment/spacecraft efficiency and your prestige, or call it back to Earth.

Under the worst circumstances, crew members can be injured or even killed. This means that the spacecraft must immediately return to Earth, even if the mission's objective has not yet been reached. Such events will also negatively affect the efficiency percentage of the equipment/spacecraft involved and your prestige.

A malfunction can occur after a mission's goal has been reached. It can still be considered accomplished if the problem is not serious, you decide to continue and the spacecraft returns safely to Earth. If a crew member is injured or dead, it will be regarded as "partially accomplished". Notice that to win the game, your pilots must return from the Moon unscathed – even if you perform a successful lunar EVA, you won't win if a malfunction occurs later and one of your pilots is injured or dies. You will win if the malfunction does not hurt your pilots. If a malfunction occurs during the early stages of a mission, e.g. if the rocket fails to lift off or even explodes on the launch pad, the mission will always be regarded as a failure.

After this section, a secret service report will appear, in order to let you understand which direction your opponents are following. When the year ends, you will also receive a message from the government, reflecting their perception of your performance.

At the end of this part, you might receive some unexpected news. Some could have a positive impact on your endeavor. Some, on the other hand, might hinder your efforts.

The game then goes back to the main menu, unless it's the spring of 1976. In this case, you lose. You will also lose, of course, if your opponents manage to walk on the Moon and come back successfully, or if your prestige drops down to zero.

Tips

Always research spacecraft, rockets and equipment to the maximum before employing them in a mission, both for safety reasons and not to lose the two percentage points of improvement after reaching maximum R&D in case of an accomplished mission.

Do not underestimate the 20% R&D bonus for serially researched capsules and rockets.

Do like they did in historical reality: do not limit yourself to a single successful launch, but keep on launching, in order to raise your prestige and reach the maximum possible efficiency. Additional launch pads will aid you with this.

Manned spacecraft should be initially launched without a crew, so that you could reach their maximum efficiency without placing at risk your pilots' lives (and being penalized if something bad happens to them).

Do not leave your pilots idle. Recruit them all and train them at all times. It is not pleasant not being able to plan an important mission because your best pilot, or the only one trained in a required ability, fell ill or was injured! Besides, pilots with high skills can make a difference in case of malfunctions.

Do not be discouraged if missions fail. It is almost impossible to finish the game without some failures, especially at higher difficulty levels. Nothing, no matter how close to perfection it might be, is breakdown-proof. Intervene as soon as possible researching again what caused the problem and try a new launch.

When the time to choose your path to the lunar manned mission arrives, take into consideration, above all, the status of your research, the amount of funds and the situation of your opponents. If funds do not abound and the opponents are close to you, or even ahead of you, it is better to rely upon available and tested technologies, rather than starting to research something new.

Information and contacts

Made with:
- ZX Basic 1.11.1 (Jose "Boriel" Rodriguez)
- Notepad++ 7.8.8 (Don Ho)
- FZX Font Editor 0.953 (Claus Jahn)
- ZX Blockeditor 2.4.3.1 (Claus Jahn)
- ZX-Paintbrush 2.6.4 (Claus Jahn)
- BMP2SCR EXP 2.11a (Leszek Chmielewski)
- Vortex Tracker II 2.5 (Sergei Bulba)
- Pasmo 0.5.4 beta 2 (Julian Albo)
- ZX7/RCS (Einar Saukas)
- Lethargeek Kompakt 1.1 (Lethargeek)

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APPENDIX

Table 1: American equipment/spacecraft

Name	Type	Crew	Cost	Cost p.t.	Max. R&D	Max. eff.	Mass	Payload
Explorer	Earth satellite	-	6/1	1	95%	98%	200	-
Ranger	Lunar satellite	-	24/5	3	90%	93%	700	-
Surveyor	Lunar probe	-	30/7	4	85%	88%	1200	-
Mercury	Capsule[1]	1	20/3	1	82%	92%	500	-
Gemini	Capsule[2]	2	30/7	2	86%	94%	1200	-
Apollo	Capsule[3]	3	40/14	5	89%	94%	1700	-
XMS-2	Mini shuttle[4]	3	55/30	7	91%	94%	1400	-
Jupiter	Lunar craft[5]	4	80/42	9	88%	94%	4600	-
LM-1	Lunar module[6]	1	42/9	4	89%	94%	1100	-
LEM	Lunar module	2	30/8	2	92%	95%	1500	-
Docking module	Docking module	-	18/3	-	92%	94%	300	-
EVA suit	EVA suit	-	18/0	1	91%	94%	-	-
Atlas	Light carrier rocket	-	26/3	2	87%	98%	-	500
Titan	Medium carrier rocket[7]	-	60/12	4	91%	98%	-	1400
Saturn V	Heavy carrier rocket	-	90/30	7	95%	98%	-	4000
Nova	Super carrier rocket	-	165/58	10	94%	98%	-	5200
Strap-on boosters	Rocket enhancement	-	18/4	2	85%	98%	-	+1000
Service module A	Service module	-	12/3	1	92%	97%	300	-
Service module B	Service module	-	18/6	2	94%	97%	700	-

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[1] Can only fly in Earth orbit. Cannot carry any module.

[2] Requires a service module A for lunar orbit missions. Requires a service module A, docking module, 1-seat lunar module and one EVA suit for lunar landing missions.

[3] Requires a service module B for lunar orbit missions. Requires a service module B, docking module, 2-seat lunar module and two EVA suits for lunar landing missions.

[4] Requires a docking module, 2-seat lunar module and two EVA suits for lunar landing missions.

[5] Requires two EVA suits for lunar landing missions.

[6] The one-man LM is a more expensive program since it would require additional automated systems and backups to assist the lone occupant.

[7] Can be equipped with auxiliary rockets/stages.

Table 2: Soviet equipment/spacecraft

Name	Type	Crew	Cost	Cost p.t.	Max. R&D	Max. eff.	Mass	Payload
Sputnik	Earth satellite	-	6/1	1	95%	98%	400	-
Kosmos	Lunar satellite	-	20/3	3	88%	93%	1000	-
Luna	Lunar probe	-	26/6	4	85%	88%	1500	-
Vostok	Capsule[1]	1	18/3	1	81%	92%	700	-
Voskhod	Capsule[2]	2	24/6	2	80%	92%	1400	-
Soyuz	Capsule[3]	3	36/12	5	86%	94%	1900	-
Spiral	Mini shuttle[4]	3	60/28	7	89%	94%	1800	-
LK-700	Lunar craft[5]	4	78/40	9	87%	94%	5300	-
LK	Lunar module[6]	1	48/9	4	90%	93%	1500	-
LEK	Lunar module	2	35/8	2	91%	94%	1700	-
Docking module	Docking module	-	15/3	-	89%	93%	300	-
EVA suit	EVA suit	-	18/1	1	91%	94%	-	-
R-7	Light carrier rocket	-	20/3	2	85%	98%	-	800
11A511	Medium carrier rocket[7]	-	52/12	4	94%	98%	-	2200
N1	Heavy carrier rocket	-	85/26	7	93%	98%	-	4500
UR-700	Super carrier rocket	-	158/50	10	94%	98%	-	5800
Auxiliary stage	Rocket enhancement	-	15/4	2	87%	98%	-	+1400
Service module A	Service module	-	12/3	1	91%	95%	500	-
Service module B	Service module	-	18/6	2	91%	95%	700	-

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[1] Can only fly in Earth orbit. Cannot carry any module.

[2] Requires a service module A for lunar orbit missions. Requires a service module A, docking module, 1-seat lunar module and one EVA suit for lunar landing missions.

[3] Requires a service module B for lunar orbit missions. Requires a service module B, docking module, 2-seat lunar module and two EVA suits for lunar landing missions.

[4] Requires a docking module, 2-seat lunar module and two EVA suits for lunar landing missions.

[5] Requires two EVA suits for lunar landing missions.

[6] The one-man LM is a more expensive program since it would require additional automated systems and backups to assist the lone occupant.

[7] Can be equipped with auxiliary rockets/stages.