FRONTIER (ELITE II) Game Info

collected by lots of people on *comp.sys.amiga.games*
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I Disclaimer

I play this game on a PC and have tried to verify as much of the given information as possible. Information that is marked with "(?)" is untested and may apply to the Amiga version only or may be wrong altogether. `(-;` Anything else may be wrong too `;-)`. If you find any mistake, I would be glad to hear from you.

Parts of the information listed here were not found by me initially, but unfortunately I cannot reconstruct who contributed all the bits and pieces. Instead I dedicate this collection to the Frontier playing network community with many thanks. I hope you don't mind, that I have put your contribution together with lots of others and redistributed the whole thing without mentioning your name.

Enough smalltalk and excuses. Now to the facts:

II Game Tips

Golden Rule

Before you do anything that looks only remotely dangerous, SAVE YOUR GAME. Do this even if you only want to do something perfectly normal. The game is full of bad surprises that have nothing to do with the game itself but with bugs and strange crashes. Always keep the last few games, in case a saved game is unusable.

Dongles and Other Strange Beasts

There have been reports of problems with Frontier on an Amiga if a dongle occupies the 2nd joystick port. If you cannot control your ship because it starts to spin uncontrollably remove the dongle and try again.

Copy Protection

The copy protection scheme counts headlines as text and ignores the case of your input. Page headers and footers and the captions of pictures are not counted as text.

Ships In System Maps

Ships are marked in the system map as little crosses in the color in which the ships would appear on the scanner. Your own position is marked with a purple dot regardless of the type of your ship and your hyperjump cloud will be marked with a blue dot. You will see the blue dot also for the hyperjump clouds of ships that you had selected before they jumped out of the system. Sometimes it is even possible to use your cloud analyzer on such clouds. You can not center the map relative to ship marks.

Planet Selection

A planet or station can only be selected if it is annotated with its name. This annotation is only performed when the game assumes that the object is clearly visible. The heuristic that is used for this decision sometimes fails badly. Therefore some planets can only be selected if the system is zoomed *and rotated* until the observer's position is near the planet. Try it with Pluto in Sol [0, 0]. It really is selectable!

Autopilot

Your autopilot tries to fly to your target in a straight line. If there is a planet between you and your target, the autopilot will happily try to fly through the planet, crashing you in the process.

If you don't want to risk crashes because of high gravity or other mishaps that could confuse your autopilot you should always land using time acceleration at least at level 2. If you don't watch it too closely your autopilot definitely performs better.

Docking

Docking your ship in a space station without causing damage can become a quite complicated task for large ships. You have to remember that your forward view from a ship like the Panther Clipper is not centered in the ship but instead you look out of your forward window that may be high above the center axis of your ship. As a result you have to aim not at the middle of the docking bay of a station but at a point somewhere in the upper half of the back wall of the dock. One nicely working trick is to use the outside view to look at your ship from a point in front of it and align your ship such that you look at it from within the station and it keeps well clear of the dock walls. In a station you may keep your landing gear up to keep your ship as small as possible.

Initial Trading

As a beginner you will want to make fast cash to be able to buy a better ship that brings you to all the wonders of the universe. You can earn your money with trading. As a beginner you should choose a trading route where there is no risk of being attacked by pirates. Sol and Barnard are two such systems. You can carry luxury goods from Sol to Barnard and robots back. Sell all of your initial equipment you don't need, to make room for merchandise. You won't need missiles, laser or your scanner. As soon as you have left Merlin (on Ross 154) you can sell your atmospheric shielding too at the next starport, if you avoid planets with atmosphere in the future. On the route between Sol and Barnard this will pose no problem, because there are enough space stations in either system. Be sure to check the bulletin board when you bring robots to Sol. Very often you can get a better price there than on the stock market.

You cannot afford Luxury Goods or Computers in the very beginning. Carry Fruit and Vegetables to Barnard instead until you have enough cash to switch to more profitable goods. Buy a bigger ship as soon as you have enough money to pay it *and* enough cash to buy some initial cargo for your new ship too.

Another good route in imperial space has been reported to be Facece to Vequess and back. You can perform military missions on one way and carry slaves back, if you don't mind the moral implications.

Crew Members

Every day at midnight the bulletin board is updated and may show new potential crew members. It is a very bad idea to fire someone of your crew. Your reputation will suffer badly. If you repeat this several times, it will take you a very long time (sometimes years!) to hire crew members again.

Passengers

Passengers want to be delivered to their destination in one month or less. If they get impatient, they will tell you so, leave at the next starport and refuse to pay. The main problem is, that your reputation will suffer badly and future passengers may even refuse to be transported by you. You can persuade them sometimes by asking several times. You should be careful with passengers that tell you, that they owe someone money. They will most probably refuse to pay at the destination port.

For some systems you need a permit to enter. The only way to get a permit is to transport a passenger or parcel to such a system. The people that give you military missions assume that you already have a permit.

Charity

If you give money to charity, you will get a better reputation and people will trust you more. This means that you can get 10% more money for deliveries, get all or part of the money in advance and more people will want to work for you (?). Your reputation will also grow if you succeed with passenger transports without receiving too much damage to your ship. Therefore giving away your money is not really necessary if your reputation is not too bad for passengers to accept you carrying them.

Dumping Radioactives

One way to get rid of the radioactive waste from military drives is to dump it into space right out of your cargo bay. If you are in a system where a strong police force is watching, this can get you in trouble even if you dump directly after your jump into the system. In such systems you should simply sell your waste or (if radioactives are illegal) find a reliable merchant on the black market who takes it back.

You can have loads of fun if you try a few highly illegal dumping places. A space port is a very nice place to dump your waste on. Some people prefer to dump their radioactives into the still open landing bay of an underground spaceport. You can even fling your waste into a long range cruiser that waits outside of some space stations. Of course you can do the same with mines for the thrill of finally seeing a mine hit something!

There seem to exist systems where you can get real money for your radioactives. Look out for systems in the state of civil war. Sometimes you can sell your radioactives there on the black market.

Countryside Landing

Lower your speed and raise your nose until you fall with approx. 3 m/s. When you are down to $10 - 15$ m, cut your speed to 0 and align your nose with the horizon. Don't forget to lower you landing gear!

Mining

Select a system with little or no registered settlers, look for an unnamed planet above 0°C and below 200°C without a starport or station and unload your MB4. Wait a few months and land near your mining equipment. Pick it up and leave. If you try again at the same place you will find less and the third time you will find nothing. This is not dependent on the time you let your machine work or the amount of minerals the machine has produced. Only the number of trials counts.

A builtin camera (you get it for your first reconnaissance mission) does not prevent you from using the mining machines. Just use the camera icon in the near of the mining machine. Frontier will know, that you don't want to take pictures.

Fuel Scoop from a Gas Giant

Autopilot to the target, aim at the horizon and set your speed to $15,000$ km/h. Use time acceleration and decelerate to keep the target tunnel frames coming at constant speed; when the atmosphere gets visible, aim for the middle and reduce your speed to 4000 km/h, go back to normal time. The fuel scoop will first fill up the cargo space and then the internal tanks.

Fighting

There seem to exist a lot of misunderstandings with respect to fighting. The first one is, that your movement vector has to point to your enemy to move towards him. This is not true. Your movement vector is shown as the vector of your movement with respect to the currently selected reference mass. This is totally insignificant for a fight, because there only the relative velocities of the fighting ships count. This also means, that you don't have to decelerate for a fight. Your attacker will have a similar velocity vector as you or he wouldn't stay in your vicinity for long. Important are the tiny differences in your movement vectors that result in movements of your ships relative to each other. If you both fly parallel with $10,000\ m/s$ in the same direction and accelerate towards each other, this will have the same effect as when you don't move at all and accelerate towards each other. What counts is the resulting relative movement. To make a long story short: Simply ignore your displayed velocity during a fight. It doesn't matter at all!

What does count is your velocity relative to the attacking ships. You cannot measure it directly, but you can select an attacking ship and watch the distance change to get an estimate of your velocity. This is the only velocity information that helps you to maneuver during a fight.

- Always switch your engines off while fighting and use mouse direction control and acceleration/deceleration buttons for maneuvering.
- Ignore the indication of your velocity vector. It is insignificant for a fight.
- Be careful not to shoot yourself with your own turret mounted lasers.
- If you attack a ship with your front laser, aim 5 deg past it, accelerate until near, decelerate and follow accelerating while it flies by. Shoot it from behind.
- You can shoot incoming missiles: evade with full thrusters, u-turn, select with annotation (to make the missile visible) and shoot.

I have developed a standard sequence for fighting that uses a little cheating to compensate for the very poor HUD and the bad interface to the functions you need during a fight:

- When the attack warning comes up, stop time.
- Switch off your engines.
- Select the outside view of your ship and zoom out as far as possible.
- Switch on the id labels to identify the attacker.
- Move the outside view until the attacker rotates into your view.
- Select the attacker and activate your radar scanner to get type and damage info.
- Remember the position of the attacker on your scanner.
- Switch back to the front view.
- Restart time.
- If you use your front laser, rotate your ship to face the attacker and use your engines to accelerate at the same time to evade the initial attack.
- Perform any maneuvers necessary and shoot to get rid of the attacker.
- Select the system map and reselect your initial target.

Some players find it sufficient to use the id labels, so they don't have to deselect the original flight target and select the attacker. I found the distance information the selection provides very helpful though. Especially when I have to use a powerful laser economically because it can be fired only a limited time until it overheats and needs time for cooling.

Military Missions

Be careful not to accept military missions that clearly cannot be finished in time. You will have to look at the destination starsystem, estimate your travelling time through hyperspace and the time you need in the target system to reach your destination. A good distance estimate is to add $10\ AU$ to the orbital distance of your destination. If your destination is orbiting another planet use the orbital distance of this planet instead and add the orbital distance of your destination to the result.

If you don't get missions from your local military agent, don't despair. Often it is sufficient to change the starport in the same system to get missions. If all else fails and you don't want to change the base for your military career, simply make a small hyperspace jump out of the system and back. In the mean time your military agent may have changed his mind. If he still has nothing to do for you you should ask yourself a few questions. Would you give someone like you military missions? For whom have you worked in the past? Are you really trustworthy? See, you know the reason!

Assassination

- Always save the game before accepting a contract.
- Don't arrive in your target system too early. If the police has enough time to investigate, the victim will be warned. This makes it very difficult to finish a contract in systems like 61 Cygni [-1, 1] or Omicron Eridani [2, 0] where you have to travel 40 *AU* or more to the next station. Don't even think about a mission for Alpha Centauri [0, 0] or Cegreth [-1, -3]. Such missions can only be accomplished if you cheat. For details see the **Autopilot Break** below. It seems to be ok. to arrive at the target system about one week before contract time.
- Don't wait too long in front of the target station or port, the victim may get frightened and refuse to start. 15 minutes before contract time seems ok.
  There seems to be a way to force victims out of a station if they refuse to start. If you attack the station, the launch bay must be cleared for the police vipers. If your victim is in the station, he/she will be in the launch bay and get forced to start as soon as you attack the station.
- Don't wait directly in front of the station, the victim may run into you.
- Don't wait directly above a star port. If the launch bay doesn't close after your start, your victim cannot start.
- You should never try to watch the take off of your victim in accelerated time. In most cases your victim will sneak past you while you are dreaming your time away and be gone before you even know it.
- Don't attack too close to a star port or station, the victim may try to land again.
- If you have to attack near a star port, don't use missiles too early. If you do, your victim might try to evade the missile and crash in the process. If your victim kills himself, you failed.
- You can use missiles to prevent the victim from hyperjumping while you attack. If you fire a missile before you use your lasers, the local authorities will charge you only 600 credits for illegal weapon usage. Otherwise you will get fined 10,000 credits for piracy and murder.
  One very nice attack method based on this trick is to wait at some planet far from your destination until you can spot your victim on the system map. As soon as it appears, target it and fire a missile. This is already sufficient to prevent your victim from hyperjumping and you can approach now and do what you came for.
- If the victim hyperjumps, use a cloud analyzer and simply follow. Select the arrival cloud and wait until the victim arrives or you can be sure it made a misjump. If you are not fast enough to overtake your victim on the direct route, you can always use a wormhole route that is nearly always faster. A drawback of the wormhole route is, that your entry point of the target system may be far away from the entry point of your victim.
- If you are too far from your victim when he or she starts, use the system map and watch for a ship mark on the map that belongs to your victim. Select it and proceed as usual. You can verify your selection via communication. Don't call, just verify the registration number.
- If you have more than one assassination on your list, collect the money for the first one before you try the next. Your employer seems to actively look for you to pay you and spreads rumors of your profession in the process. This obviously warns other victims.

With these points in mind I have succeded with every contract (civil or military) that I have accepted so far. In every case a victim didn't show up I could find a reason from the list above

and succeeded in the next trial.
On the other hand there have been reported lots of problems with victims not showing up or refusing to land at the port of destination. Some of these problems seem to stay even if you use every trick in the book. In such a case your only chance is to reload a saved game from the time before you accepted the contract.

Reconnaissance Missions

One problem with such missions is, to find your target at all. It should work if you approach the planet until it nearly fills your screen. If the military base is visible, you should see it as a grey pixel that can be selected. If you don't see it, fly to the back of the planet or simply wait a few hours (in accelerated time) until the planet rotates the base into your view.

The maximum distance to take pictures from is about 80 km. You get excellent pictures if you fly below 10 km. One nicely working method for an approach is:

- Use autopilot and maximum time acceleration until you arrive in the "vicinity of the planet".
- Use time acceleration 3-4 and $50,000\ km/h$ to fly to $7000 - 8000\ km$ distance.
- Orbit the planet and lock on the target when it is at the horizon.
- Save the game.
- Aim a little below the horizon and descend to $1000 - 3000\ m$.
  On planets with high gravity this is the most difficult part. I always save a game before actually reaching the planet so I can try different routes to the target station. The problem on planets with high gravity is, that you don't get height information until you cannot decelerate anymore in time to avoid a crash. You have to approach such planets very carefully. Another problem is, that you can control you descent only via the velocity readings because you cannot see your actual velocity vector or the target tunnel with your nose up high enough to make a controlled descent to your target. You can aim at your target with your nose up, if you use the outside view.
- Continue towards your target with 10.000 km/h and time acceleration 2 until your distance is down to 200 km.
- Decelerate to 5.000 km/h and switch off time acceleration.
- From a distance of 80 km downwards you can take pictures. I usually fly between the towers or a small distance above. After you have taken the pictures, accelerate with full power and make your escape.
- After having taken my pictures I often pick a few interesting enemies and practice my fighting skills before jumping out of the system.

A few times I managed to rough land between the buildings of a target station. The stations don't seem to have a starport, but only a hangar out of which the interceptors start. It is interesting to watch them materialize in front of this hangar (and crash shortly afterwards).

Reconnaissance missions to imperial stations are most difficult, because you are attacked by Imperial Couriers with 20 MW lasers. For my Asp with up to 10 shields this means that you are history with only one direct hit. If you fly very low between the buildings of a target station you must be extremely careful, not to be rammed by an enemy ship that suddenly appears directly in front of you.

Bombing Missions

If you have succeeded with reconnaissance missions and shot a lot of excellent pictures you will find bombing missions very boring. You can fire your nuclear missile from 500 km distance or even more without adverse effects if the station lies within your line of sight. The crater that replaces the station after a successful attack is no hole in the ground. It hovers above the planet just where the station used to be. If you rough land at the position of the station you land actually below the crater. Very strange...

Ratings

If you want to improve your combat rating fast, there is one simple trick. Buy a Panther Clipper and equip it with about 300 shield generators. It is nearly invincible now. Select a system with lots of pirates. Anarchies are very nice and some dictatorships also work very well. Jump into the system and switch off your engines. Accelerate time to the maximum and wait for the pirates to come. When they arrive, simply wait. They will crash into you and you will get the bonus for destroying them. Only one ship can get dangerous to you and this is the Imperial Courier which is very often equipped with a 20 MW laser. Fight this one and do it carefully because once this gun starts to hit you, your shields will degrade very fast and you don't have the engine power to evade quickly.

After you have cleaned up the system, jump to a neighbor system and back or still better, simply jump to another anarchy. Repeat until you run out of fuel, are bored too much or have advanced to ELITE after 6000 destroyed ships.

As soon as you get reconnaissance missions from the military, you can advance even faster. Pick a mission to a station on a planet with low gravity and fly towards it. From approximately 500 km downward you can watch interceptors start continuously. All you have to do is to reduce your velocity or switch off your engines and wait until they start crashing into you. In the near of imperial stations it is not as easy, because you will have to actively fight the attacking Imperial Couriers that would cut you into pieces otherwise. They are quite easy to destroy, if you adapt your course until they approach you in a straight line. Then you can activate the autopilot and fire as soon as they are in range. As long as you move to follow one of the Imperial Couriers the others are usually too clumsy to hit you hard enough to cause damage. Other ships can safely be ignored. They will crash into you from time to time or reduce your shields a few percent if they hit you with their lasers. Keep well above the planet to avoid crash landings.

You can accelerate all this still further if you use an energy bomb to wipe out a lot of enemies with one keypress. This works most satisfactory if you are surrounded by lots of police vipers after some little disagreements with the local authorities.

Sling shot

Aim just past a large gas giant and get fast enough (700 km/s for Jupiter). Switch off your engines and watch. Speed and distance are critical. You will have to practice a bit to get the feeling.

Sightseeing

You can fly through all the domes on planets without a breathable atmosphere and land between the buildings. If you do this for the transparent domes at Ross 154 you will find in one dome administration buildings of Vega Line, Sirius Corporation and other trading houses and in the second dome the usual combination of concrete blocks and green patches in between with scattered brick houses. It is definitely fun to fly between the buildings and look at your surroundings. Agriculture domes are a bit boring, because they contain nothing more than lots of green balls at ground level.

Domes that are not tranparent, can be entered too but contain absolutely nothing. It is interesting, that they are no obstacle for you though. At least they are good for some very strange graphical effects if you land in one of these domes and use your outside view to look at your surroundings.

In every major city with more than the space port and a little industry you can find little churches with working clocks. The cities are structured as large blocks of ugly concrete buildings and patches of green between them with scattered brick houses and every now and then a little church. Try to rough land in the vicinity of such a church and watch the clock on the church steeple. Use time acceleration for better effect. If you are close enough you can even read the roman numbers on the clock face. The buildings give you an interesting impression of the size of your ship. A Cobra MK III looks huge compared with this tiny little church. And have you ever seen a huge space ship standing in the graveyard behind a church? It looks definitely strange.

At some time in the future I will look for one of the bridges you can see in the intro sequence of the game. This will be my last action before voluntary retirement. A kind soul already gave me the tip to look in the near of New San Francisco on Earth, Sol [0, 0]. Do you really want me to retire?

Other Galaxies

If you use the galactic view and zoom out of the galaxy you can see lots of other galaxies that are arranged in a regular grid. These galaxies are all copies of your home galaxy, so it is really not worth the effort to try and find wormholes to distant galaxies. There is only one galaxy and a lot of mirror images.

Thargoids

A lot of oldtimers from the era of the original Elite game still remember the menace of the Thargoids and miss them in Frontier. Nobody has seen a Thargoid in Frontier yet but in an interview David Braben shall have told that there is a single Thargoid ship in a system far out in the galaxy. I personally think this is only a trick to keep us playing Frontier until add-ons appear. But who knows?

If you fly bombing missions to federal bases you can sometimes see two big violet octagonal ships that look just like the good old Thargoid ships but they are not disturbed by your approach. Perhaps the Thargoids sleep for a few hundred years after the exhausting fight with mankind?

III Bugs / Features

Enemies One At a Time

Maximum time acceleration will separate groups of ships to get them in line, waiting for you.

Perfect Autopilot

Your autopilot always succeeds if you use maximum time acceleration.

Planet Landing Without Fuel

While you still have fuel, use the autopilot to align with your target planet, switch to maximum time acceleration and wait for the landing sequence. Switch back to maximum time acceleration and you are save.

Zero Time Shooting from Gun Turrets

If an attacker approaches, get him in sight of a laser turret, stop time, select the attacker, aim the laser and test fire (you see the blue or the explosion light effect if you hit). Keep firing while releasing the time stop. Repeat if necessary.

Missile Fire While Docked

You can fire missiles even from within a space station. This might help in case of the passenger/no crew problem described in the Bugs / Bugs section.

Certain Missile Hit

Switch to maximum time acceleration after firing the missile. Your missile will hit even if you use a nuclear missile and/or have 900 km distance to your target.

Selling Ship With Passenger

If you sell a ship with passenger on board you get the money and keep the ship (and the passenger). This bug seems to be fixed in the 1.05 version of the game for the Amiga and in the American PC version.

Engine Upgrade for Imp Courier or Imp Trader

The only way to get an upgrade for the non-removable engine in an Imperial Courier or an Imperial Trader seems to be to let it fail due to maintenance neglection and then put in a new engine. The new engine will be fixed just as the original drive.

To let time pass in a controlled way select a route between two star systems and perform lots of jumps. If you select Barnard $\leftrightarrow$ Sol, you can sell all your equipment except for the autopilot and load your ship with fuel for the jumps. After 10 or 11 months you should stop jumping around to avoid a misjump. The few remaining days you can simply wait outside a station until your drive falls off.

Autopilot Break

You can activate the autopilot for immediate deceleration from arbitrary high velocities in the vicinity of your selected target, if you use maximum time acceleration.

Crash Avoidance

Assume you have to perform a mission on some planet, reached it and find out that you are too fast to be able to decelerate in time to avoid a crash landing. What can you do? The correct way is to watch the crash, reload a previously saved game and try again. The Frontier way is to use time acceleration to avoid the crash. Simply switch to maximum time acceleration just before the crash. You will make a big jump through the planet and be safe at some distance at the other side.

This is not really a bug but more or less a consequence of the implementation of time acceleration. Collisions are detected if your ship collides with an object at a given time frame of the simulation. When you accelerate time these time frames are farther apart and so are your positions in space if you are moving. If your position at one time frame is above a planet and at the next time frame on the other side of the planet Frontier will not detect the collision that should have happened in between. A simple picture can illustrate this:

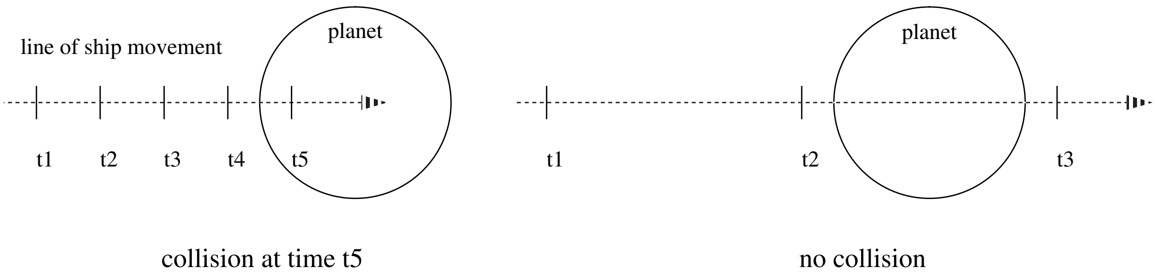

Figure 1: Collisions are only detected if you collide with an object at one of the time frames of the simulation

Fast Ascent to ELITE

You can use the properties of time acceleration to acsend to ELITE status very fast, once you get foto or bombing missions. Just buy a Panther with lots of shields, get yourself an imperial foto or bombing mission and stop about 10 km above the target station. Next destroy all ships in your near. You can use your turrets and the zero time shooting feature to achieve this. Now you can select the first level of time acceleration. The ships that now start from the station fly directly into your shields and are destroyed. The only thing you have to watch very carefully is your height above the planet. You can expect a "right on commander" message every 7 to 10 minutes. These messages reset time acceleration, so you will have to destroy all ships in your near again and select time acceleration until the next message comes up. After a few hours of work you will have advanced to ELITE status.

You can not use higher time acceleration levels because then the destroyed interceptors are not counted.

Negotiations With The Police

If you have been caught selling or buying illegal goods or having them on board, the police will fine you. If the officer is not corrupt, you can always lower your fine to the original amount if you claim you "haven't done it".

IV Bugs / Bugs

Most of the bugs can be circumvented in one or another way. The only bug that really annoyed me is the crash that happens after you have unloaded a mining machine and leave the system (PC only). This bug makes the mining part of the game unplayable and should have been found if the game had been beta tested at all. The many program confusions and crashes during heavy fights are a nuisance that can only be partially avoided with frequent game saving.

- The german translation is a complete mess. Most of the time it gives you crippled nonsense texts and hides important information in a ruined screen layout. Game and manuals are full of spelling errors and sometimes you have to translate text back to English to be able to understand it at all.
- The protection scheme sometimes gets confused and asks for the first letter of e. g. page 8238, line 27764, word 29263.
- The attack and missile warnings and the "photograph taken" message stay on the screen much too long, hiding vital scanner information. In case of an attack warning you can stop time as soon as the warning is given, select the attacker and start normal time again. The warning is sometimes repeated, but then you already have some hints about the position of the attacker.
- In some systems (mostly large systems with more than one sun, e. g. Cegreeth [-1, -3]) the reference mass selection is broken and will not switch to the nearest planet or station. In some cases it is sufficient to avoid the autopilot and fly by hand. In some systems even this does not work (because of discretization problems if the reference mass is too far away?) and the target will jump around wildly. Sometimes it helps not to use maximum time acceleration or fly by hand. If this does not help either:

  1. Avoid such systems.
  2. If you absolutely have to dock or land in such a system use the autopilot to accelerate under maximum time acceleration, switch off your engines until you are 1-2 AU from your target and reactivate autopilot (still under maximum time acceleration) to decelerate and teleport to your target.
  3. If 2. fails, try again from another angle.

  Reconnaissance missions to such systems are very difficult, because you cannot use the teleport-and-decelerate trick. Furthermore the drawing of the target planet gets totally inconsistent with the drawing of the station to be filmed, resulting in "flying" stations that seem to be located above the planet and other strange effects that make navigation by hand a matter of pure luck. I got such missions to Micanex C,Da [3, -4] and Hoethcan A,B3b [3, -5].

- Bombing missions for systems like Candaess [2, -4] lead to problems too. You cannot hit the flying station above Candaess A,B1b because the nuclear missile seems to have a fixed velocity between $15,000$ and $25,000$ km/h. Because the gravitation reference is never switched to the planet, you have to adjust your velocity relative to Candaess C,D. In my case I had to select around $28,000$ km/h to be able to approach the station at all. Whenever I fired my missile it somehow decelerated and never reached the station. The only trick that worked was to fire the missile from a distance around 900 km and use the missile-hit feature/bug to destroy the station. You can do this only from a great distance because you are unable to switch to full time acceleration if the interceptors are near you.
- In systems with a central supergiant, the simulation of this sun is broken. In the Betelgeuse system [59, 14] I got no gravitational effect of the central sun and could fly right through it. The displayed disk sometimes transformed into a rotating rectangle (e. g. at 1.39 AU distance) and sometimes vanished completely (e. g. at 0.8 AU distance). The supergiant was never selected as reference mass.
- If you are near a planet that was not selected as reference mass (see above), you can watch the same effects for this planet as have been described for supergiants.
- Sometimes the scanner may fail without damage report. All systems seem to be ok., but the scanner doesn't show the attacking ships. It has been reported that you can fly through these ghost ships without damaging them or you. This seems to happen mostly in the near of the famous "flying" stations above planets that have not been selected as reference mass. The attacking ships also fire at you but seem to be unable to hit.
- Be careful not to accept delivery missions to systems without bases or space stations. You might not be able to deliver.
- You sometimes get reconnaissance or bombing missions from the military that are impossible to accomplish, because there is no planet in the denoted system. These missions are cancelled as soon as you select them but they stay in the mission list.
- If you are stuck in an underground base but have enough fuel and your engines are ok., there is no safe way to start but you can try out a few alternatives that have been reported to work in some cases:

  1. Use maximum time acceleration just after you have got launch permission. When you get the message that your launch time expired, switch to maximum time acceleration again.
  2. Build up a little motion, pull up your landing gear and use maximum time acceleration to warp through the wall.
  3. Buy lots of shields and fly through the wall.
  4. Perform takeoff as if all were normal (up gear, increase throttle, pull up nose) this might result in your ship starting normally.

  For some of these methods a few retries might help (save the game before you try anything!). If nothing else helps, select a target for a hyperjump and force a misjump via `ALT` + `F8`.
- Some versions of the game for the Amiga don't allow you to jump into the van Maanens [0, 1] system. Neighbor systems are reachable without problem, the star map shows the system as reachable but you cannot trigger the hyperjump to van Maanens.
- On planets with a breathable atmosphere you are sometimes cleared for landing on pads that are already occupied by other ships that seem to have landed far from their destination pad.
- Mountains are sometimes placed directly on the landing pads of a starport on planets with a breathable atmosphere.

- Sometimes a starport is reported to be busy even if there are free landing pads and no incoming ship exists that may have been assigned to the pad.
- If you do not have enough crew and a fugitive passenger on board, someone might attack you from outside a station, preventing time acceleration to wait for enough crew *and* (through the passenger) also the selling of your ship. The only way to solve this dilemma seems to be to use the missile bug to shoot the attacker from inside the station (?).
- The autorefuel system may magically empty your internal tanks if you try to fill them by hand. I had this effect in a Panther Clipper once even without the autorefuel system.
- When a passenger gets impatient waiting to be delivered and leaves at the next starport, you get cabins that are falsely reported occupied, preventing you from selling your ship or using the cabin again. The only way out of this situation seems to be to buy an escape capsule and use it at the next opportunity. You will lose your ship but you can at least buy a new one.
- If you have more than one MB4 mining machine, you must always deal with the last one on your list first. If you by accident destroy or even sell another one first, the game crashes (?).
- Do not leave a system with mining gear left behind. The game will crash. This seems to be a problem that appears only in the PC version. As in the missile fire bug on the Panther this is a bug in the EMS handling that hits you whenever you hyperjump.
- If, as a result of your asteroid mining operation, many objects appear in your neighborhood, the game may crash (?).
- You have not fulfilled a killing contract if your victim crashes.
- If you fly towards the horizon of a planet, strange graphical effects may happen, showing pie slices of the planet flashing everywhere. Also the horizon may jump wildly up and down.
- The same effect happens if you are in the midst of a fight at the right height above a planet. Your enemies will wildly jump around making them impossible to hit. Interesting enough they don't seem to have the same problems.
- You can fly through mountains, transparent domes, buildings and the walls of spaceports.
- On some star ports ships of contract targets seem to be unable to start without crash. This happens preferably on planets with gravity comparable to earth gravity or higher. Example: Lion Transport in Manchester City on Matthews World in Behoqu [2, -4]. The only workaround I have found is to avoid contracts to such targets.
- The height calculations are broken on some planets, e. g. on Hoopers World in 82 Eridani, where I got a distance reading of 0.65 km for a target that was at the starport (not yet started!) and my height was shown as 2345 meters. Another example is Mitterand's World in Liabeze [2, -4].
- For the upper gun turret on the Tiger Trader at elevation angles above 50 deg, 5 MW beams fill the whole lower screen or strange crossing beams are shown, hiding possible targets.
- Missiles that are fired from a Panther Clipper crash immediately without hitting anything except the own ship. This makes many bombing missions impossible to accomplish with a Panther. The bug only appears after hyperspace jumps (EMS access on the PC) and you can avoid it if you dock at a station or land at a starport before you try to fire a missile. You can shorten the extra time you need for this if you use the Autopilot Break to reach the point of your intermediate landing as early as possible. This makes bombing missions to systems with spaceports possible but still leaves a lot of impossible cases.

- The trajectory drawing for planets or stations shown in the system map sometimes gets confused and draws straight lines from one point of the trajectory to the screen border.
- A jump into the Beta Lyrae system [-146, 85] crashes the game.
- The attempt to get system info for the Andolqu system [-76, 29] crashes the game.
- If you select system info for an unexplored system, you get the info for the last selected explored system.
- If you select population info for an unexplored system, the game may crash.
- Sometimes you may get a starport reported to be located on a sun. While being docked at Gilmour Orbiter in Tau Ceti, system info showed a starport on the sun Exbephi B [-1225, -853]. The starport vanished when I jumped into the system. Also a population of 100,000 to 1 Million was reported for Ethfala [-2174, -879] which is a binary system without planets!
- If you recenter the star map to your position you will still get the system info of the system you looked at before recentering until you have moved the cursor away from your current system and back.
- Sometimes a selected star is not surrounded with the green circle at the position of the star but at the wrong end of the pin which shows the system's height with respect to the galactic ecliptic.
- The ships section of the documentation contains at least 19 errors.
- The masses of Panther, Kestrel and Hawk do not add up to the total mass of 1775 t, 20 t and 18 t respectively.
- The reverse thrusters of the Eagle MkII are way too weak to be meant this way. The available 4 g should probably be 14 g.
- If you switch between the status screens of your display, your ship may get drawn erroneously on the contract list page.
- In the repair section of the shipyard, hull damage is not measured relative to the actual hull weight and can exceed the actual hull weight by a large amount.
- After a heavy fight the repair section of the shipyard may get confused. I once got as a damage report the message of the police officer that arrests you if you haven't paid your fines. The repair costs were 26315 credits.
- Another effect in a similar situation produced damage reports for all my thrusters that kept reappearing at each entry of the repair screen even after repair. Save and restore of the game didn't help. I had to return to a saved game from before the fight.

  The effect can be reproduced if you buy a new ship and immediately buy a new drive for it. If you now enter the repair screen, all your thrusters are reported to be damaged. You can try to repair them with very strange effects that cause repaired thrusters to get damaged from the repair of other thrusters. If you have succeeded with the repair and no thruster is reported damaged anymore, you will get the old damage reports again the next time you enter the repair screen.

  The effect can be ignored and will vanish after you have refueled and taken off to the next starport.

- You can get game crashes during a fight. A few times I got strange beeps from the speaker in my PC that got lower and lower until the game froze. The exect situation was a fight where I was receiving damage by an enemy laser when he was hit by my front laser simultaneously.
- The ejection system may be triggered if you try to rough land with a large ship (?).
- If you crash during a failed attempt to rough land, the game may crash with a memory exception.
- The system map allows centering on planets only if the planet is annotated with its name. The annotation sometimes happens only shortly before the planet vanishes from the screen. For some planets it is very difficult to find a rotation/zooming combination that works, for some planets like Phiagre A,B2 [1, -3] I have not yet found a setting that makes the planet selectable.
- When you have docked at a station using maximum time acceleration, the system map still shows your position outside the station.
- If you hyperjump while traffic control is warning you you will get a final warning message and a fine from the star system you jump into.
- In early versions of the game for the Amiga there is a bug that may confuse the bulletin board that then shows parts of the stockmarket section. One trick to avoid this problem is to always return to the top of the bulletin board before leaving it. If the damage is done, you can accelerate time to wait until midnight. The bulletin board will then be reset and corrected.
- The manual states that the game is completely playable via keyboard, but I have not found an equivalent to a right mouse click on the keyboard. Therefore rotation control for the system and sector maps seems to be dependent on the mouse.
- A mouse click that misses a function icon or the scanner display in the lower part of the screen deselects the current target. As a consequence you often have to reselect your target only because you missed some icon by a small amount.
- Released mouse keys sometimes keep autorepeating.
- The joystick cannot be calibrated and is way too imprecise (even with a high quality joystick) on a 40MHz 386 PC.

V Hacking and Cheating

If you don't want to spoil your game completely, please ignore this section!

V–A Executables

FRONTIER.EXE and the .OVR files of the PC version have been packed with an LZEXE compatible packer. You can safely unpack them, they will run without problems afterwards. The advantage of unpacking your executables is that you can use your favourite byte editor to look for strings in the game and find out what you can expect in your future gameplay. It also should speed up the startup time of your game significantly.

V–B Save Files

Saved games are not portable between the Amiga and the PC versions of the game. They seem to be compressed in the PC version but the compressor program is not yet known.

There are some hack sheets floating around for the Amiga version but I will not include them here because I simply don't like this kind of cheats. I think it is bad enough to exploit the bugs in the game for your gameplay. If you really want to cheat badly, write your own game or find out the cheats for yourself!

VI Wish List

- If the system map would follow the events outside, you could watch your progress in the map without having to switch repeatedly between main view and map.
- It should be possible to center the system map relative to a displayed ship.
- There should be a possibility to fast zoom out of the system map just enough to make your ship or the next planet visible.
- It would be nice to have a stack of autopilot targets: select your flight target, push it and select a target for a fight, return to your flight target...
- If you don't use the autopilot, it is very difficult to land on planets with high gravity, because you have no easy way to estimate your current position relative to the planet without deselecting your target. It would be nice to have a switchable height meter that gives you readings all the time (not only from 50.000 m downwards) in addition to your information about the target distance. Also some velocity information like rate of descent and velocity with respect to the planet surface would be extremely helpful. Why not switch to a HUD that contains this information in the near of a planet, if your autopilot is not activated?

VII Flight Physics

$$\begin{array}{llrll} 1\ \mathrm{AU} & = & 1.496 \times 10^{11} & m & \text{(astronomical unit)} \\ 1\ \mathrm{g} & = & 9.81 & m/s^2 & \text{(gravitational acceleration on earth)} \\ 1\ \mathrm{h} & = & 3,600 & s & \text{(hour)} \\ 1\ \mathrm{d} & = & 86,400 & s & \text{(day)} \end{array}$$

VII–A Equations for Free Fall

With velocity v $[m/s]$, acceleration a $[m/s^2]$, distance d $[m]$ and time t $[s]$ we get:

$$v = at = \sqrt{2ad} \ , \qquad d = \tfrac{1}{2}at^2 \ , \qquad t = \tfrac{v}{a} = \sqrt{\tfrac{2d}{a}} \tag{1}$$

VII–B Navigation Equations

For the distance d travelled with initial acceleration a_1 and final deceleration a_2 the values of interest for the journey are the maximum velocity at the turning point (where we change from acceleration to deceleration) v_u, the distance d_2 of the turning point from the target and the time t_d that is needed for travelling the distance d.

We assume that forces other than those produced by our own engines can be neglected and that we start and reach the target with zero velocity. Furthermore we assume that the engines are used all the time at full power.

If the main engine is used for acceleration *and* deceleration the equations are very simple:

$$v_u = \sqrt{ad} \ , \qquad t_d = 2\sqrt{\tfrac{d}{a}} \ , \qquad d_2 = \tfrac{d}{2} \tag{2}$$

This fastest mode of flight is used to accelerate up to the turning point velocity at the distance d_2, turn the ship and decelerate until the target is reached.

If the autopilot is used instead, it will use the main engine for acceleration and the secondary thrusters (retro thrusters) for deceleration. In this case we get the equations:

$$v_u = \sqrt{2d\tfrac{a_1 a_2}{a_1+a_2}} \ , \qquad t_d = \sqrt{2d\tfrac{a_1+a_2}{a_1 a_2}} \ , \qquad d_2 = d\tfrac{a_1}{a_1+a_2} \tag{3}$$

The time t_d is always a lower bound for the really used time because the autopilot doesn't use the engines at full power all the time.

I approximated the real time consumption of autopilot flight with a least mean square fit of data from 20 undisturbed flights with a Cobra MK III. Measuring the distance in astronomical units $[AU]$ and the acceleration in units of earth gravitational acceleration $[g]$, I got for the time $[d]$:

$$t_d^A = \frac{1.212}{86400}\sqrt{\frac{2.992\times 10^{11}}{9.81}\frac{d(a_1+a_2)}{a_1 a_2}} - 0.001 \tag{4}$$

VII–C Hyperdrives and Jump Ranges

A hyperdrive lets you travel its maximum range in seven days, which is 168 hours. Travel time is linear with distance, so you will use one day to travel a seventh of your hyperdrive range. For a class n drive you will need n^2 tons of fuel to travel the maximum range, except for the class 8 hyperdrive which actually is a class 9 drive and therefore uses 81 tons for a maximum range jump. The fuel consumption is linear with the distance, using only integer amounts of fuel, so you will need e. g. $\lceil\frac{n^2}{2}\rceil$ tons of fuel to travel half the maximum drive range. The only difference between the civil and military versions of a drive is the weight of the drive and the type of fuel used.

The relation between jump cost c $[t]$, jump time t $[h]$, ship mass m $[t]$ and jump distance d $[lj]$ can be expressed a little more exact to give you a few numbers to crunch. Here the equations:

$$c = \left\lceil\frac{dm}{200}\right\rceil \ , \qquad t = \frac{168}{200}\frac{dm}{h^2} \tag{5}$$

If you set the time to the maximum 168 h in the second equation you can calculate the maximum range of the drive of a given class in a given ship. If you do this for the class 8 drive in a Panther or Boa you get inconsistencies. From table 1 you can see that the class 8 drive behaves like a class 9 drive in the Panther and like a class 7.79 drive in the Boa. I hope this indicates a mistake in the table. The maximum ranges for the Lynx Bulk Carrier and the Long Range Cruiser are calculated as if the class 8 drive were actually class 9 drive. I don't know whether these ships can carry hyperdrives at all.

VIII Wormhole Theory

The following seems to be invalid for the newer PC versions of the game.

A ship can jump very large distances due to a modulo effect in the hyperspace continuum with a base of $W_{sect} = 81.62$ sector lengths (655.36 lj). One can use this behavior to find jump paths that are much shorter in time and fuel consumption than the straight distance. This also allows you to use a smaller hyperdrive and leaves more room for fuel and cargo.

The optimal jump points for a journey between two systems with one intermediate stop are found on the intersections of circles around the two endpoints of the journey. On such a circle lie the systems that can be reached from the center of the circle with a minimum amount of fuel and time. A system at the intersection of such circles can be reached easily from the centers of both circles, making it an ideal intermediate jump point. The circles have multiples of the wormhole distance (655.36 lj) as radii.

To make the calculations simple we assume at first, that the "thickness" of a sector can be neglected and that two jumps with equal distance shall be made, resulting in circles with equal radius. The coordinates of the ideal intermediate jump points can now be found on a line that perpendicular bisects the segment between the two endpoints of your journey, at the points of intersection of the circles around the endpoints.

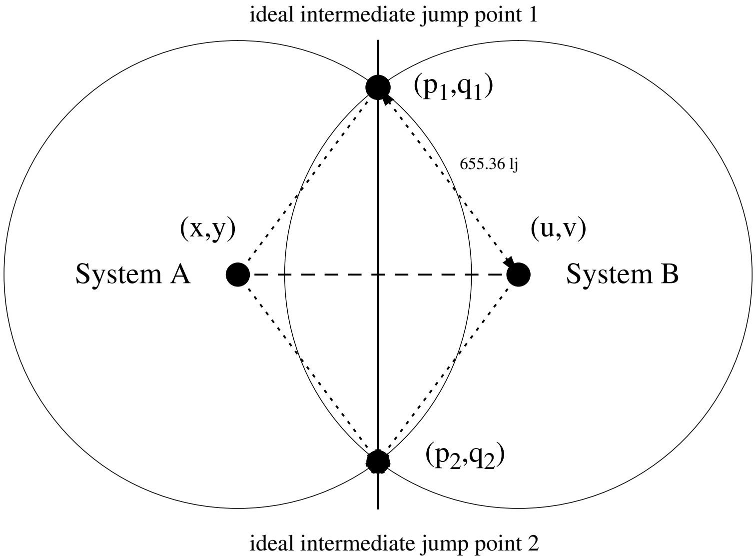

Figure 2: Location of intermediate jump points for equal distance wormhole jumps

For two star systems at the coordinates (x, y) and (u, v) we define:

$$a = (u - x) \ , \qquad b = (v - y) \tag{6}$$

We choose a jump distance of $W_n = n \times W_{sect}$ sectors. With this definitions we get as coordinates for the intermediate jump (p, q):

$$p = \tfrac{x+u}{2} + b\sqrt{\tfrac{W_n^2}{a^2+b^2} - \tfrac{1}{4}} \ , \qquad q = \tfrac{y+v}{2} - a\sqrt{\tfrac{W_n^2}{a^2+b^2} - \tfrac{1}{4}} \tag{7}$$

or

$$p = \tfrac{x+u}{2} - b\sqrt{\tfrac{W_n^2}{a^2+b^2} - \tfrac{1}{4}} \ , \qquad q = \tfrac{y+v}{2} + a\sqrt{\tfrac{W_n^2}{a^2+b^2} - \tfrac{1}{4}} \tag{8}$$

Now n has to be chosen such that the square root has a real solution (the jump radius is larger than the half distance between the systems) and we have to find a system near one of the intermediate jump points. If such a system cannot be found, we simply increment n and try again with a wormhole distance of the next greater order.

If you want to perform two jumps with different jump sizes the equations have essentially the same structure but get a bit more complicated. We define a and b as in (6) and choose the jump distances $W_m = m \times W_{sect}$ for the first jump and $W_n = n \times W_{sect}$ for the second jump. m and n must be chosen such that:

$$\left| m - \frac{\sqrt{a^2+b^2}}{W_{sect}} \right| \leq n \leq m + \frac{\sqrt{a^2+b^2}}{W_{sect}} \tag{9}$$

This ensures, that there exists an intermediate jump point at all. With

$$\alpha = \frac{W_m^2 - W_n^2}{2(a^2+b^2)} + \frac{1}{2} \tag{10}$$

we get for the coordinates of the intermediate jump point (p, q):

$$p = (1-\alpha)x + \alpha u + b\sqrt{\frac{W_m^2}{a^2+b^2} - \alpha^2}\ , \qquad q = (1-\alpha)y + \alpha v - a\sqrt{\frac{W_m^2}{a^2+b^2} - \alpha^2} \tag{11}$$

or

$$p = (1-\alpha)x + \alpha u - b\sqrt{\frac{W_m^2}{a^2+b^2} - \alpha^2}\ , \qquad q = (1-\alpha)y + \alpha v + a\sqrt{\frac{W_m^2}{a^2+b^2} - \alpha^2} \tag{12}$$

IX Programs for a HP42S pocket calculator

Here comes a collection of programs for my pocket calculator that I have found useful in navigation and the collection of statistical data.

IX–A Convert time display formats

First a program that converts a time interval given as days:hours:minutes to decimal fractions of a day:

```
% convert number in the form ddhhmm to a decimal dd.dd form
% ==========================================================
%
% memory:       dhm     day in ddhhmm form

lbl     "dhm->d"
input   "dhm            % input ddhhmm here
xeq     d
stop
goto    "dhm->d"

% subroutine for conversion ddhhmm -> dd.dd
% ----------------------------------------
%
% input:        ddhhmm on stack
%
% memory:       00      accumulator for dd.dd
%               01      temporary storage
%               02      unprocessed input

lbl     d
sto 02
10,000 /
ip                      % isolate day number
sto     00
10,000 x
sto-    02              % remove days, leaving hhmm
R^                      % normalize stack
rcl     02
100 /
ip                      % hours number
sto     01
24 /                    % hours per day
sto+    00
R^                      % normalize stack
rcl     01
100 x
rcl     02
x<>y
-                       % leave mm entry of input
1440 /                  % minutes per day
rcl+    00
rtn
end
```

IX–B Estimate travel time

The next program uses equation (4) to calculate an estimate for the duration of a flight. You put the acceleration of your main and secondary thrusters into the global variables **mn_g** and **bk_g** and the program asks you for the distance in astronomical units. Acceleration is measured in units of earth gravitational acceleration and is constant for a given ship, so you have to initialize the variables only once for a ship. The calculated time is output in decimal fractions of a day.

```
% calculate time estimate in days for a local journey
% ===================================================
%
% memory:       mn_g    acceleration of main thruster in g
%               bk_g    acceleration of back thruster in g
%
%               s_au    distance to be travelled in AU

lbl     "au->t"
input   "s_au"
sqrt

% calc. factor for conversion

rcl     "mn_g"
rcl+    "bk_g"
9.81 /
rcl/    "bk_g"
rcl/    "mn_g"
2.992E11 *
sqrt
1.212 *

*                       % mult with conversion factor
86400 /                 % convert to days dd.dd
0.001 -
end
```

IX–C Calculate jump points

The following program uses equations (10) to (12) to calculate the position of jump points for wormhole jumps. You provide it with the jump orders and in complex form the coordinates of your current and target system. It gives you the coordinates of the optimal jump points as output (also in complex form).

If no jump point exists for the given jump orders, an error is produced while calculating the square root.

```
% calculate coordinates of jump point
% ===================================
%
% memory:       ord1    order of first jump
%               ord2    order of second jump
%               x,y     coordinates of start system  (complex)
%               u,v     coordinates of target system (complex)
%
%               00      x
%               01      y
%               02      u
%               03      v
```

```
%               04      a = u-x
%               05      b = v-y
%               06      alpha
%               07      x + alpha * a
%               08      y + alpha * b
%               09      a^2 + b^2
%               10      sqrt (...)
%               11      a * sqrt
%               12      b * sqrt

lbl     "hjmp"
realres                 % only real results of sqrt
fix     02              % only two digits after decimal point

input   "ord1"          % get order of jumps
input   "ord2"

input   "x,y"           % get start coordinate
complex                 % convert to real/real
sto     01
R^
sto     00
R^
input   "u,v"           % get target coordinate
complex
sto     03
rcl-    01
sto     05              % store b
R^
sto     02
rcl-    00
sto     04              % store a

% calculate alpha

x^2                     % a^2
rcl     05
x^2
+
sto     09              % save a^2 + b^2
2 *
rcl     "ord1"
81.62 *
x^2
rcl     "ord2"
81.62 *
x^2
-
x<>y
/
0.5 +
sto     06              % store alpha

% calculate sums in front of square root

rcl*    04
rcl+    00
```

```
sto     07              % x + alpha * a
R^
rcl     06
rcl*    05
rcl+    01
sto     08              % y + alpha * b
R^

% calculate square root

rcl     "ord1"
81.62 *
x^2
rcl/    09
rcl     06
x^2
-
sqrt
sto     10
rcl*    04
sto     11      % a * sqrt
R^
rcl     10
rcl*    05
sto     12      % b * sqrt

% calculate coordinates of first jump point

rcl+    07      % p coordinate on stack
rcl     08
rcl-    11      % q coordinate on stack
complex

% and now the second jump point

rcl     07
rcl-    12      % p coordinate on stack
rcl     08
rcl+    11      % q coordinate on stack
complex

end
```

X Keyboard Reference (German Keyboard)

global control	
game exit	: `^C`
pause	: `ESC`
accelerate time, level `x`	: `SHIFT` + `Fx`
dump screen (?)	: numeric `*`

cursor control	
move cursor	: `ALT` + arrow keys
select (= mouse left)	: numeric `0`

flight control	
turn down	: `A`
turn up	: `Y`
turn starboard	: `.`
turn port	: `,`
accelerate	: `CR`
decelerate	: `RIGHT SHIFT`
hyperjump	: `H`
force misjump	: `ALT + F8` in flight menu

external view control	
rotate	: arrow keys
zoom in	: ß
zoom out	: '

weapon control	
fire laser	: `SPC`
fire missile	: `M`
fire ECM	: `E`
fire energy bomb	: `B`
activate radar scanner	: `R`
activate milit. camera	: `D`
activate escape capsule	: `X`

sector map	
recenter map	: `C`
hyperjump	: `H`
map panning	: arrow keys
fast map panning	: `SHIFT` + arrow keys

system map	
time forward	: `RIGHT` arrow key
time backward	: `LEFT` arrow key or `#`
fast zoom-in	: double click zoom-in

misc	
unload/pick up MB4	: `D`

In menues you can select the items via keyboard. To select an item you simply type the number (NOT on the numerical keypad!) of it's position in the list. The items are numbered from top to bottom, starting at 1. The keys `2`, `4`, `6` and `8` on the numerical keypad are equivalent to the arrow keys.

XI Game Tables

XI–A Ships

Ships are given with their type, hull weight, loading capacity, retro thruster acceleration, main thruster acceleration, number of crew members, number of gun mountings, number of missile pylons, jump distances for different drive classes, possibility to mount a fuel scoop, the initial drive class and the price. Values that differ from the manual are marked with a frame.

Type	Hull	Cap t	Re	Mn g	Cr	Gn	Ms	Drive	FS	Cl	Pr k
Adder	15	40 t	8.0	18.1 g	1	1	0	1 : 3.63/14.54/32.72	y	2	73 k
Anaconda	150	650 t	3.0	6.0 g	$\boxed{8}$	2	8	4 : 4/6.25/9/12.25	y	6	1,060 k
Asp	30	120 t	7.0	22.2 g	2	2	1	2 : 5.33/12/21.33	y	3	187 k
Boa	200	1300 t	4.0	8.0 g	$\boxed{10}$	4	6	5 : 3.33/4.8/6.53/8.1	y	8	2,474 k
Cobra Mk I	15	60 t	6.0	16.1 g	1	2	2	2 : 10.66/24	y	2	97 k
Cobra Mk III	20	80 t	7.0	20.1 g	1	2	4	2 : 8/18	y	2	124 k
Constrictor	30	90 t	10.0	22.0 g	2	2	2	2 : 6.66/15/26.66	y	2	143 k
Eagle Mk I	5	20 t	10.0	25.2 g	1	1	2	1 : 8/32	n	1	38 k
Eagle Mk II	6	22 t	4.0	28.2 g	1	1	2	1 : 7.14/28.57	n	1	41 k
Eagle Mk III	8	22 t	15.1	28.2 g	1	1	2	1 : 6.66/26.66	n	1	43 k
Falcon	5	11 t	9.0	30.2 g	1	1	2	1 : 12.5	n	1m	46 k
Gecko	11	34 t	9.0	$\boxed{16.1}$ g	1	2	1	1 : 4.44/17.77/40	n	2	66 k
Hawk	5	$\boxed{7}$ t	6.0	27.2 g	1	1	2	1 : 11.11	n	1m	48 k
Imp Courier	130	350 t	6.0	16.1 g	$\boxed{1}$	1	6	3 : 3.75/6.66/10.41/15	n	5	609 k
Imp Trader	175	525 t	4.0	9.0 g	$\boxed{1}$	1	6	4 : 4.57/7.14/10.28/14	n	6	949 k
Int. Shuttle	4	4 t	3.0	5.0 g	1	0	0	—	n	I	14 k
Kestrel	5	$\boxed{9}$ t	6.0	25.2 g	1	1	2	1 : 10	n	1m	50 k
Krait	8	$\boxed{27}$ t	10.0	20.1 g	1	1	4	1 : 5.71/22.85/51.42	n	1	50 k
Lifter	3	7 t	2.0	4.0 g	1	0	0	1 : 20	n	I	16 k
Lion	65	235 t	3.0	5.0 g	4	$\boxed{3}$	$\boxed{8}$	3 : 6/10.66/16.66	y	3	348 k
Moray	17	70 t	6.0	14.1 g	1	1	4	2 : 9.19/20.68	y	2	109 k
Osprey	4	11 t	8.0	27.2 g	1	1	2	1 : 13.33	n	1m	45 k
Panther	400	$\boxed{2000}$ t	3.0	6.0 g	$\boxed{12}$	4	8	6 : 4.05/5.52/9.1	n	8	2,753 k
Puma	175	825 t	3.0	6.0 g	$\boxed{9}$	4	8	4 : 3.2/5/7.2/9.8	y	6	1,265 k
Python	100	400 t	4.0	10.0 g	7	2	4	3 : 3.6/6.4/10/14.4	y	4	575 k
Sidewinder	8	25 t	12.1	23.2 g	1	1	0	1 : 6.06/24.24/54.54	y	1	44 k
Tiger Trader	80	320 t	5.0	12.1 g	5	$\boxed{3}$	1	3 : 4.5/8/12.5/18	y	4	472 k
Transporter	40	160 t	4.0	9.0 g	3	$\boxed{3}$	2	2 : 4/9/16/25	n	3	241 k
Viper	15	50 t	10.0	24.2 g	1	1	4	1 : 3.07/12.3/27.69	y	2	87 k
Lynx Bulk Carrier	1200	6000 t	1	3 g	20	0	0	8 : 2.25	?	?	7,228 k
Long Range Cruiser	1000	15000 t	1	3 g	100	1	0	8 : 1.01	?	?	16,110 k

Table 1: Ship Reference

The drives for Imperial Courier and Imperial Trader are fixed and not changeable. The Interplanetary Drive of the Lifter cannot be removed to add a jump drive.

The Lynx Bulk Carrier and the Long Range Cruiser can both sometimes be seen in the near of space stations. They don't seem to move but if I remember right, the Lynx Bulk Carriers at least answer your communication. Long Range Cruisers seem to be abandoned and are only good for hide and seek games with the Vipers of the local police or for target practice. I know of no opportunity to buy one of the ships.

XI–B Lasers and Shields

A shield works like an extra hull that can take up to 16 tons damage before your real hull is damaged. It regenerates at a few percent per second and does this faster if you use an Energy Booster (approximately 3% per second). The regeneration rate is independent of the number of shields you have and the state of your shields. The strength of your shielding is proportional to the number of your shields, so 10 shields can take 160 tons damage before your hull is damaged. A pulse laser can inflict 12.5 tons of damage per MW power. This means that one shield can absorb one hit of an 1 MW pulse laser and will degrade to 22% in the process. A directly following second hit would reduce your shield to 0% and cause nine tons of damage to your hull. This shows that the damage a shield can absorb is proportional to its state, which means that one shield can take e. g. eight tons of damage at 50% reducing it to 0% without causing damage to your hull.

Here a more complex example: You have two shields and get hit four times by an 1 MW pulse laser. Your shields recharge 5% between the hits. The first hit reduces your shields from the original 32 tons protection to 19.5 tons protection or 60%. Before the next hit the shields recharge 5% to 21.1 tons protection. The next hit reduces the shields to 8.6 tons which are recharged to 10.2 tons. The third hit cuts through your shields and causes 2.3 tons damage to your hull. Recharge will bring your shields back to 1.6 tons protection and the last hit will take them down again and cause another 10.9 tons of damage to your hull for a total damage of 13.2 tons.

The higher firing rate of beam lasers seems to result in approximately five times the power of pulse lasers resulting in higher damage over the same time interval. This means that a 1 MW beam laser should be approximately equivalent to a 5 MW pulse laser. Mining lasers have a very low firing rate but inflict enough damage to destroy an Imperial Courier with one hit. The damage they can cause with one hit is estimated to be somewhere between 750 and 1,500 tons.

XI–C Equipment

The possible equipment items together with their weight are given in the following table:

Equipment	Weight	Equipment	Weight
XB13 Dummy Mine	1 t	XB74 Proximity Mine	1 t
Energy Bomb	4 t	KL760 Homing Missile	1 t
LV111 Smart Missile	1 t	NN500 Navy Missile	1 t
30 MW Mining Laser	10 t	1 MW Pulse Laser	1 t
5 MW Pulse Laser	3 t	1 MW Beam Laser	5 t
4 MW Beam Laser	20 t	20 MW Beam Laser	75 t
100 MW Beam Laser	200 t	Laser Cooling Booster	1 t
Small Plasma Accel.	500 t	Large Plasma Accel.	900 t
ECM	2 t	Naval ECM	2 t
Cargo Bay Life Support	1 t	Extra Passenger Cabin	5 t
Auto Pilot	1 t	Auto Refueller	1 t
Scanner	1 t	Radar Mapper	1 t
Hyper-Space Cloud Anal.	1 t	Shield Generator	4 t
Energy Booster	5 t	Escape Capsule	5 t
Atmospheric Shielding	1 t	Hull Auto Repair	40 t
Fuel Scoop	6 t	Cargo Scoop Converter	2 t
MB4 Mining Machine	30 t	Interplanetary Drive	4 t
Hyperdrive Class 1	10 t	Hyperdrive Class 2	25 t
Hyperdrive Class 3	45 t	Hyperdrive Class 4	80 t
Hyperdrive Class 5	150 t	Hyperdrive Class 6	250 t

Equipment	Weight	Equipment	Weight
Hyperdrive Class 7	400 t	Hyperdrive Class 8	600 t
Military Drive Class 1	6 t	Military Drive Class 2	12 t
Military Drive Class 3	24 t	Military Drive Class 4	? t
Fighter Launcher	? t		

Table 2: Equipment Reference

A Class 8 Hyperdrive can only be bought as a builtin drive with the Boa or the Panther Clipper. No one has ever seen a Class 4 Military Drive or a Fighter Launcher but there are rumors that they exist in the game somewhere.

XI–D Merchandise

Just for reference, here the list of merchandise:

Merchandise			
Water	Liquid Oxygen	Grain	Fruit and Veg.
Animal Meat	Synthetic Meat	Liquor	Medicines
Fertilizer	Luxury Goods	Heavy Plastics	Metal Alloys
Precious Metals	Gem Stones	Minerals	Hydrogen Fuel
Military Fuel	Industrial Parts	Computers	Air Processors
Farm Machinery	Roboters	Radioactives	Rubbish
Narcotics	Animal Skins	Live Animals	Slaves
Hand Weapons	Battle Weapons	Nerve Gas	

Table 3: Merchandise Referenc

XI–E Ranks

Here comes the list of ranks in the German and the English version together with the number of points you have to get to advance to a given rank.

Federation German	English	Empire German	English	Points
Keiner	None	Außenseiter	Outsider	0
Gefreiter	Private	Leibeigener	Serf	1
Unteroffizier	Corporal	Master	Master	16
Feldwelbel	Sergeant	Sir	Sir	81
Hauptfeldwebel	Sgt-Major	Squire	Squire	256
Major	Major	Lord	Lord	625
Oberst	Colonel	Baron	Baron	1,296
Leutnant	Lieutnant	Viscount	Viscount	2,401
Korvettenkapitän	Lt. Commander	Count	Count	4,096
Kapitän	Captain	Earl	Earl	6,561
Kommodore	Commodore	Marquis	Marquis	10,000
Konteradmiral	Rear Admiral	Herzog	Duke	14,641
Admiral	Admiral	Prinz	Prince	20,736

Table 4: Rank Reference

The following table shows the correspondence between the mission type and the points you get for the successful completion of a mission:

Mission Type	Points
delivery	2
assassination	14
foto	16
bombing	18
“excellent” foto	20

Table 5: Points for Missions

Different kinds of military missions are bound to your rank. In the federation you carry unimportant stuff until you get promoted to Sergeant; then the first secret messages may be carried by you. You will get your first military assassination mission as Sgt-Major. After your promotion to Major you will get additional reconnaissance missions and a Colonel may execute bombing missions. The empire handles equivalent ranks the same way. You seem to get no new type of mission when you advance further in rank although there are many rumors that you get new missions to destroy enemy ships at Commodore/Marquis level.

The above does not hold, if you execute missions for more than one side. I made the mistake of working for the empire after I advanced to Colonel and had gotten my first few bombing missions. I advanced to Squire in the empire and went back to the federation. Now I had the problem, that I got no more bombing missions but had to stay with the usual reconnaissance missions. I eventually got bombing missions again, but working for the empire surely stopped my federal career for a while.

The safest way to advance in the federation and the empire at the same time seems to be the famous “rank swing”: Advance one rank in the federation, work for the empire and advance one rank there, return to the federation and so on until you are Admiral/Prince and ELITE and bored to death.

Your rank is not the only prerequisite you need to get a certain type of mission. You have to own all the possible medals for earlier missions first. You get medals for:

1. the first delivery of an important item like gravitic detonators,
2. the first delivery of secret communication,
3. the first successful assassination,
4. the first successful reconnaissance mission,
5. the first reconnaissance mission with resulting excellent film and
6. the first successful bombing mission.

A strange side effect is, that you must not perform all reconnaissance missions perfectly, because if you do, you will not get your fourth medal!

The complete list of medals for the German and the English version of the game looks as follows:

Federation German	English	Empire German	English
Tapferkeitsurkunde	Certificate of Valor	Rote Armbinde	Crimson Brassard
Sternexplosion	Starburst	Schwarzes Polygon	Black Polygon
Purpur-Omega	Purple Omega	Goldene Lanze	Gold Spike
Zinnober-Krone	Vermillion Crest	Platinkreuz	Platinum Cross
Blauer Exzelsior	Blue Excelsior	Ehrenlegion	Legion of Honour
Frontier Medaille	Frontier Medal	Himmelskrieger	Celestial Warrior

Table 6: Medal Reference

XI–F Combat Rating

And here your combat rating with more magic numbers. They seem to denote the number of ships you have destroyed multiplied by 256. In other words, you get 256 points for each destroyed ship regardless of its type.

German	English	Points	Kills
Harmlos	Harmless	0	0
Meistens Harmlos	Mostly Harmless	1,024	4
Schwach	Poor	2,048	8
Unterdurchschnittlich	Below Average	4,096	16
Durchschnittlich	Average	8,192	32
Überdurchschnittlich	Above Average	16,384	64
Kompetent	Competent	32,768	128
Gefährlich	Dangerous	256,000	1,000
Tödlich	Deadly	768,000	3,000
ELITE	ELITE	1,536,000	6,000

Table 7: Rating Reference

For every 256 destroyed ships you will get a message like: "right on commander". This is an indication of your advances between the ranks. From the table you can see, that you should get Dangerous between the third and the fourth message of this kind. You advance to Deadly between the 11th and 12th message. You should become ELITE after the 23rd message.

XI–G Legal Status

The last table gives the possible legal status with the associated fines (?):

German	English	Fine
W. Weste	Clean	0
Straff'll.	Offender	1
Krimin.	Criminal	5,500
Outlaw	Outlaw	20,000
Flüchtig	Fugitive	100,000

Table 8: Legal Status Reference

XII System Info

There seem to be differences between the coordinates of systems in the PC and the Amiga version of the game. Usually they are smaller than one sector, the only verified case of a large difference being the Andolqu system [PC -76, 29], [Amiga -74, 29]. The following tables correspond to the PC version. If you find systems to be located in a different sector on your Amiga, I would be glad to include a list of differences (that you will have to provide). If they are too many, it would be interesting to find out, whether a more systematic approach could be successful.

The system names in the tables that correspond with really existing astronomical objects are printed underlined. Not all probable candidates for astronomical objects (like 82 Eridani) could be found in the star catalogues I have access to. They may be astronomical objects or not.

XII–A Settlements and Tourist Attractions Far Out

Here comes a list of inhabited systems with starports far from the core systems, mixed with a few systems of specific interest.

System	Coord	Politics	Comments
Aaqu	[771, -1302]	indep corp	
Ackargre	[-4310, -1999]	indep anarchy	
Ackarol	[-2000, -879]	indep corp	
Alcyone	[32, 32]	uninhabited	
Aliafa	[-2107, -1017]	indep corp	
Antares	[-39, -34]	uninhabited	no planets
Anvequ	[360, -5]	indep corp	
Arfaess	[1020, 0]	indep corp	
Arwabe	[-766, -766]	indep corp	
Atlas	[32, 32]	uninhabited	
Ayessand	[-1022, -1022]	indep corp	
Aysool	[-1495, -1574]	indep anarchy	
Ayurda	[-666, 117]	indep anarchy	
Becaness	[772, -1303]	indep corp	
Becanol	[-1509, -35]	indep corp	
Beenbe	[-2757, -35]	indep anarchy	
Beenla	[254, 0]	indep corp	
Beta Lyrae	[-146, 85]	uninhabited	contact binary star
Betelgeuse	[59, 14]	uninhabited	supergiant
Betiess	[-2344, -35]	indep anarchy	
Daaya	[937, 789]	indep anarchy	
Edaso	[-1790, -1790]	indep corp	
Edcelia	[-2107, 503]	indep corp	
Edenve	[254, 0]	indep corp	
Electra	[32, 32]	uninhabited	
Enangre	[-1225, -922]	indep corp	
Enlabe	[-1792, -1792]	indep corp	

System	Coord	Politics	Comments
Enquze	[-1674, -1498]	indep corp	
Esswaze	[-1790, -1790]	indep corp	
Exvefa	[-2000, -1945]	indep corp	
Faarfa	[-509, -770]	indep corp	
Fainin	[771, -1302]	indep corp	
Famiay	[-2107, -63]	indep corp	
Greurqu	[772, -1303]	indep corp	
Hadar	[-6, -40]	uninhabited	supergiant
Hoessce	[-5180, -2000]	indep corp	
Ioandqu	[772, -1303]	indep corp	
Iocana	[-383, -207]	indep anarchy	
Ioceay	[-1509, -35]	indep corp	
Ioquex	[772, -1303]	indep corp	
Iozeio	[-376, -426]	indep corp	
Lahola	[1022, -4]	indep corp	
Lasolia	[-2000, -1566]	indep corp	
Maia	[32, 32]	uninhabited	
Merope	[32, 32]	uninhabited	
Micanex	[-739, -539]	indep anarchy	
Miphimi	[-2102, -1745]	indep corp	
Oletphi	[-2331, -35]	indep corp	
Phiolbe	[-2187, -35]	indep anarchy	
Pleione	[32, 32]	uninhabited	
Polaris	[0, 76]	uninhabited	supergiant
Qumia	[-2107, 503]	indep corp	
Rigel	[92, 6]	unexplored	supergiant
Solaqu	[-2107, -1017]	indep corp	
Spica	[-4, -17]	uninhabited	no planets
Taygete	[32, 32]	uninhabited	
Tiafa	[-748, -863]	indep corp	
Urbela	[-719, -6]	indep corp	
Urceve	[-1814, -1745]	indep corp	
Urioed	[-2000, -879]	indep corp	
Ururur	[-1814, -1745]	indep corp	
Vewela	[-1790, -1790]	indep corp	
Wafaa	[-666, 117]	indep anarchy	

XII–B System Database

A table of systems I have had contact with is given on the next pages. For every system the sector coordinates, maximum distance to the nearest starport or station and the political system are listed together with some comments.

System	Coord	AU	Politics	Comments
1°4774	[-1, 1]	9.02	indep corp	
AC+79°3888	[0, 2]	8.97	indep corp	
Aandti	[0, -5]	8.58	indep corp	no starport
Achenar	[1, -4]	57.78	imp capital	luxury goods export, computer import, radioactives illegal, Honest John Thatcher's ok, avoid Ulrich's Warehouse
Ackcanphi	[-4, -4]		indep disputed	
Ackdati	[0, -5]	19.74	imperial	
Ackexa	[-3, 3]		indep corp	
Acklave	[2, -2]	18.30	indep anarchy	no starport
Ackwada	[-5, -3]		indep corp	
Ackzece	[1, -5]	10.30	imperial	
Aenze	[3, -6]	8.68	indep anarchy	
<u>Alcor</u>	[0, 5]		indep corp	no planets
<u>Aldebaran</u>	[6, 4]		uninhabited	no planets
<u>Alioth</u>	[0, 4]	23.63	indep democracy	disputed system
<u>Altair</u>	[-2, 1]	10.87	fed democracy	robot import
<u>Alpha Centauri</u>	[0, 0]	990.00	fed colony	
Anacka	[4, -4]	9.21	indep corp	no starport
Anacketh	[0, -5]	13.79	imperial	
Anave	[3, 0]	7.70	indep anarchy	
Anayeth	[-1, -4]		imp colony	
Andceeth	[-5, 2]		indep disputed	
Andcefa	[2, -3]	11.15	imp colony	
Andinol	[3, -6]	4.15	indep anarchy	no starport
Andwafa	[-2, 3]		indep corp	
Anlaol	[1, -6]	11.19	imperial	
Anlave	[0, 3]	10.57	fed democracy	
Anphiex	[2, -2]	10.98	indep corp	
Arayess	[4, -7]		indep dict	under federal interdict
<u>Arcturus</u>	[-2, 0]	12.02	fed democracy	
Arexack	[-1, -5]		indep corp	
Aveed	[3, 0]	12.73	indep corp	
Ayarlia	[3, 1]	6.94	indep corp	
Ayethti	[-3, -1]		indep democracy	
Ayfati	[1, -5]	9.69	imperial	
Aymiay	[1, 4]	6.17	fed democracy	
Aymifa	[2, -5]	10.81	imperial	
Aymigre	[2, -3]	9.32	indep anarchy	no starport
Ayqugre	[4, -5]	11.02	indep anarchy	no starport
Ayurso	[4, 0]	9.09	indep civil war	exorbitant prices for robots and luxury goods
BD 946	[-1, 2]		indep corp	
<u>Barnard</u>	[-1, 0]	11.08	fed colony	robot export, luxury goods import, Haynes and Son Inc., Merchant Darke's ok
Becanin	[3, 0]	7.71	indep corp	
Bedaho	[-4, -2]	7.74	fed democracy	
Befaqu	[-2, 8]		indep dict	under federal interdict
Behoqu	[2, -4]	9.34	imperial	contract targets may crash on start from Manchester City

System	Coord	AU	Politics	Comments
Besaex	[3, 0]		indep corp	
Beta Hydri	[0, -2]	10.69	fed democracy	
Beuress	[0, -5]	10.62	indep anarchy	
Beurqu	[3, -5]	10.60	indep anarchy	no starport
Bewaack	[0, -5]	10.92	indep anarchy	no starport
CD-37°15492	[0, 0]	10.52	indep corp	
CD-44°11909	[-1, -1]	11.20	indep anarchy	
CD-46°11540	[-1, -1]	10.94	indep corp	
CD-49°13515	[-1, -1]	8.65	indep corp	
Canayce	[2, -6]	421.41	indep anarchy	
Candaess	[2, -4]	238.55	imperial	
Caninve	[3, -2]	9.48	indep anarchy	no starport
Canopus	[6, -6]		indep anarchy	supergiant
Capella	[4, 4]		indep corp	
Ceessze	[3, -4]	10.15	indep anarchy	
Cegreeth	[-1, -3]	220.00	imp colony	reference selection fixed on Cegreeth D, discretization problems
Cemiess	[-2, -2]		imperial	negative black market prices for gem stones and precious metals, Richard's Exchange, Patrick's Exchange, Judd's Trading ok
Cetilia	[4, -5]	17.10	indep anarchy	
Cygni, 61	[-1, 1]	48.62	fed democracy	single starport, often busy
Daceess	[2, -5]	17.01	indep anarchy	no starport
Dainay	[2, 3]	10.49	indep corp	
Dainfa	[3, -6]	10.72	indep corp	
Delta Pavonis	[-1, -2]	10.59	fed democracy	many political contracts
Diso	[-3, -6]		indep democracy	
Edethex	[3, -3]	8.35	fed democracy	
Edlave	[3, -2]	15.64	indep anarchy	no starport
Edliaze	[2, -2]	10.01	indep corp	
Enaness	[-5, 1]		indep communist	
Encea	[-2, 2]	10.73	indep corp	
Enquze	[4, -3]	10.79	indep corp	
Epsilon Eridani	[1, 0]	11.07	indep corp	
Epsilon Indi	[-1, -1]	10.63	fed democracy	
Eridani, 82	[1, -1]	9.02	indep corp	
Essaa	[1, -5]	10.37	imperial	
Essethlia	[4, -2]		indep corp	
Essliagre	[2, -4]	11.33	indep anarchy	no starport
Eta Cassiopeia	[0, 2]	10.09	fed base	bring your own military fuel
Ethgrece	[2, -5]	9.23	indep corp	
Exbeur	[-3, 4]	10.31	fed colony	no military fuel
Exhoed	[2, 4]	9.90	indep dict	
Exioce	[-1, -3]	10.54	imperial	
Exiool	[2, -4]	10.79	imperial	
Exlagre	[-5, 3]		indep corp	
Extila	[-4, -1]		indep feudal	

System	Coord	AU	Politics	Comments
Facece	[0, -4]	9.59	imp base	luxury goods, medicine export, many military missions
Famiso	[3, -4]	7.59	indep corp	
Faphive	[3, -4]	8.73	indep anarchy	no starport
Fawaol	[2, -3]	15.84	imp colony	
Fomalhaut	[-1, 0]	14.11	fed democracy	radioactives illegal, Austin's Exchange, Shepherd's Merchandise ok, avoid O'Hanlon's Goods Emporium.
Greayqu	[3, -2]	272.33	indep anarchy	no starport
Gretiay	[3, 2]		indep	no population
Groombridge 34	[0, 1]	135.23	indep corp	
Hobegre	[2, -6]	111.44	indep anarchy	no starport
Hocancan	[1, -3]	14.38	indep anarchy	no starport
Hoethcan	[3, -5]	614.74	indep anarchy	no starport
Inedol	[3, -5]	5.81	indep anarchy	no starport
Inena	[3, -6]	9.22	indep dict	
Intiol	[2, -4]	380.41	indep anarchy	no starport
Ioarqu	[2, -3]	530	indep anarchy	no starport
Iohoay	[3, 0]	8.46	indep corp	interesting contracts
Ioioqu	[4, -5]	11.21	indep anarchy	no starport
Ioliaa	[2, -6]	10.06	indep corp	
Ioququ	[3, -4]	10.93	imperial	
Iozegre	[3, -2]	634.68	indep anarchy	no starport
LP 658-2	[2, 0]	10.14	indep anarchy	
Lacaille 8760	[-1, 0]		indep corp	
Lacaille 9352	[-1, 0]		indep corp	
Lacancan	[3, -6]		indep anarchy	no starport
Laedgre	[2, -2]	9.14	indep anarchy	
Laedla	[-4, 1]		imp colony	
Laesscan	[4, -3]	74.92	indep anarchy	no starport
Laiogre	[4, -4]	8.13	indep anarchy	
Lalande 21185	[0, 0]	9.94	indep corp	
Lalande 25372	[0, 0]	10.48	indep corp	
Lave	[-3, -6]		indep dict	
Liabeze	[2, -4]	10.77	imperial	
Liaedin	[4, 3]		indep disputed	
Liaququ	[2, -2]	10.07	indep democracy	
Luyten	[-1, 0]		indep corp	
Luyten 97-12	[1, -2]	11.14	indep corp	
Luyten 205-128	[-1, -2]	7.88	indep corp	
Luyten 674-15	[2, -1]	10.68	indep corp	
Luyten 789-6	[-1, 0]		indep corp	
Maanens, van	[0, 1]	9.49	indep dict	isolationistic religious enclave, permit required
Miandze	[3, -5]	547.58	indep anarchy	no starport
Micanex	[3, -4]	92.42	indep anarchy	no starport
Miolgre	[2, -5]	8.52	imperial	
Miolze	[2, -3]	9.25	indep corp	

System	Coord	AU	Politics	Comments
Mizar	[0, 5]		indep corp	no planets
Olaygre	[4, -3]	7.63	indep anarchy	
Olcanze	[1, -3]		imperial	
Ollaex	[2, -3]	11.19	indep corp	no starport
Oltiqu	[-1, 4]	11.76	fed democracy	
Omicron Eridani	[2, 0]	43.38	indep corp	
Ophiuchi, 36	[-1, -1]	78.84	indep corp	
Ophiuchi, 70	[-2, 0]		indep corp	
Phekda	[2, 5]	13.61	indep anarchy	
Phiagre	[1, -3]	241.90	indep corp	
Quexce	[-2, -2]	9.45	indep corp	
Quince	[-1, -5]		imperial	
Quphieth	[-3, 0]		indep feudal	
Ququve	[1, 4]		fed democracy	
Regulus	[5, -1]		indep corp	no starport
Riedquat	[-3, -6]		indep anarchy	
Ross 128	[0, 0]	10.71	fed colony	prison colony, permit needed, Donaldson's Warehouse ok
Ross 154	[-1, 0]	10.65	fed colony	single starport, often busy, Merchant Nakamichi's ok
Ross 986	[2, 1]	9.96	fed democracy	
Sigma Draconis	[-1, 2]		indep corp	
Sirius	[1, 0]	20.18	indep corp	
Sodaack	[1, -6]	12.34	indep anarchy	no starport
Sohoa	[0, -4]	10.71	imperial	
Sol	[0, 0]	9.47	fed capital	luxury goods export, robot import, good ship selection at Moon, radioactives illegal, Haynes Merchandise, Greenhill's Warehouse, Brennans Holdings, Honest John Coate's, Baker's Trading Company, Merchant London's, Honest John Loma's ok, avoid Honest John Brennan, Merchant Gomez's, Thatcher's Merchandise, Macmillan's Goods Emporium, Sheehan's Exchange
Sophilia	[3, -1]	10.38	indep corp	
Tau Ceti	[0, 0]	10.04	fed democracy	many military missions, Gilmour Orbiter is a good base for a federal military career
Tiacan	[3, -4]	6.48	imperial	overpopulated
Tiancan	[4, -5]	11.95	indep anarchy	no starport
Tiaycan	[3, 0]	10.83	indep anarchy	
Tiessgre	[3, -3]	306.07	indep anarchy	
Tiliala	[-4, -1]		fed democracy	
Tivecan	[2, -3]	248.84	indep anarchy	no starport
Urfaa	[5, 7]		uninhabited	station
Urlaay	[3, -2]	10.82	indep corp	robot export for Zeaex
Urquay	[4, -5]	6.85	indep anarchy	no starport
Veareth	[0, -5]	21.02	imperial	no starport
Vecanlia	[0, -5]	11.31	indep anarchy	no starport

System	Coord	AU	Politics	Comments
Vega	[-3, 2]	10.40	fed democracy	
Vequess	[0, -4]	8.88	imperial	
WX Ursa Majoris	[1, 1]		uninhabited	no planets
Waarze	[4, -4]	133.73	indep anarchy	
Waayol	[4, -5]	9.77	fed democracy	
Waceol	[3, -4]	162.38	indep anarchy	no starport
Waessol	[2, -3]	305.88	indep anarchy	no starport
Wainze	[3, -2]	9.90	indep corp	
Waolex	[4, -4]	549.67	indep anarchy	
Wolf 359	[0, 0]	11.35	indep corp	
Wolf 630	[-2, -1]	170.00	fed democracy	radioactives illegal
YZ Canis Minoris	[2, 0]	8.79	indep communist	permit required
Zeaex	[3, -2]	10.29	indep disputed	robot import, lots of trouble
Zeancan	[2, -2]	9.68	indep anarchy	
Zeanlia	[2, 2]	34.99	indep corp	
Zearla	[-5, 1]		indep feudal	
Zeceand	[6, 10]		uninhabited	starport
Zeessze	[0, 3]	9.20	fed democracy	
Zeessze	[1, -6]	9.02	indep anarchy	
Zelada	[1, 4]		indep anarchy	

XIII Wormhole Routes

In this table, sector coordinates are interpreted relative to the integer coordinates of a sector center (the intersection of the faintly colored lines). Therefore the sector [0, 0] has the corners [-0.5, 0.5] [0.5, 0.5], [0.5, -0.5] and [-0.5, -0.5]. Furthermore the coordinates [-0.7, 1.3] are located in sector [-1, 1].

I am sure that for many jumps better jump points can be found, but this little navigation library already helps me a lot. It gets continuously updated.

From	Coord	To	Coord	Via	Coord
1°4774	[-0.65, 1.25]	Delta Pavonis	[-0.90, -1.70]	Exaycan	[80.80, -7.25]
1°4774	[-0.65, 1.25]	Eta Cassiopeia	[0.00, 2.50]	Anlaso	[-72.80, 39.60]
1°4774	[-0.65, 1.25]	Maanens, van	[-0.05, 1.10]	Anexess	[19.65, 80.40]
1°4774	[-0.65, 1.25]	Sol	[0.00, 0.20]	Exquar	[-70.10, -42.05]
1°4774	[-0.65, 1.25]	Tau Ceti	[0.30, 0.40]	Milaze	[-54.95, -59.90]
AC+79°3888	[0.15, 1.80]	Eta Cassiopeia	[0.00, 2.50]	Aressan	[80.15, 19.30]
AC+79°3888	[0.15, 1.80]	Zeanlia	[1.60, 1.95]	Inarin	[8.80, -79.60]
Aandti	[-0.10, -4.75]	Tau Ceti	[0.30, 0.40]	Dalaar	[81.60, -8.05]
Achenar	[0.95, -4.15]	Barnard	[-0.75, 0.10]	Inarho	[76.00, 28.20]
Achenar	[0.95, -4.15]	Eta Cassiopeia	[0.00, 2.50]	Zetiso	[81.35, 10.80]
Achenar	[0.95, -4.15]	Facece	[0.30, -4.05]	Ayvequ	[-11.65, -85.10]
Achenar	[0.95, -4.15]	Sol	[0.00, 0.20]	Ceioho	[80.45, 15.20]
Achenar	[0.95, -4.15]	Tau Ceti	[0.30, 0.40]	Vecanwa	[81.45, 9.90]
Ackdati	[0.40, -5.15]	Sol	[0.00, 0.20]	Esshocan	[-81.25, -9.20]
Ackdati	[0.40, -5.15]	Tau Ceti	[0.30, 0.40]	Zeandar	[-81.35, -3.80]
Acklave	[1.80, -2.50]	Tau Ceti	[0.30, 0.40]	Anmiay	[73.80, 36.15]
Ackzece	[1.30, -5.20]	Tau Ceti	[0.30, 0.40]	Olethan	[-79.50, -17.75]
Aenze	[2.95, -5.85]	Tau Ceti	[0.30, 0.40]	Greanda	[-73.35, -35.10]
Alioth	[-0.50, 4.40]	Anlave	[-0.20, 2.80]	Ethveur	[80.55, 18.60]
Alioth	[-0.50, 4.40]	Aymiay	[0.90, 4.25]	Grececan	[9.15, 85.80]
Alioth	[-0.50, 4.40]	Dainay	[1.60, 2.95]	Etheneth	[-45.85, -63.65]
Alioth	[-0.50, 4.40]	Eta Cassiopeia	[0.00, 2.50]	Migreur	[-79.30, -17.40]
Alioth	[-0.50, 4.40]	Exhoed	[1.95, 4.00]	Phicanve	[14.25, 85.00]
Alioth	[-0.50, 4.40]	Oltiqu	[-1.50, 3.95]	Arsoa	[-34.30, 78.80]
Alioth	[-0.50, 4.40]	Phekda	[1.50, 5.00]	Enphiphi	[23.80, -74.20]
Alioth	[-0.50, 4.40]	Sol	[0.00, 0.20]	Andesswa	[81.85, 12.00]
Altair	[-2.00, 0.65]	Andwafa	[-1.90, 3.05]	Ackgrean	[-83.75, 5.30]
Altair	[-2.00, 0.65]	Arcturus	[-1.50, -0.50]	Arquho	[73.25, 32.70]
Altair	[-2.00, 0.65]	CD-46°11540	[-1.20, -1.30]	Ackena	[-77.30, -31.35]
Altair	[-2.00, 0.65]	Cygni, 61	[-0.90, 1.20]	Tiioess	[35.25, -72.35]
Altair	[-2.00, 0.65]	Delta Pavonis	[-0.90, -1.70]	Iozeti	[-75.50, -35.15]
Altair	[-2.00, 0.65]	Epsilon Indi	[-0.50, -0.65]	Daayho	[52.40, 61.65]
Altair	[-2.00, 0.65]	Eta Cassiopeia	[0.00, 2.50]	Miarfa	[54.75, -58.30]
Altair	[-2.00, 0.65]	Lalande 25372	[-0.45, -0.25]	Aydami	[39.60, 70.95]
Altair	[-2.00, 0.65]	Liabeze	[1.60, -4.20]	Ceandphi	[-65.90, -50.60]
Altair	[-2.00, 0.65]	Luyten 97-12	[0.90, -1.95]	Soedar	[-55.00, -61.65]
Altair	[-2.00, 0.65]	Ophiuchi, 36	[-1.80, -1.15]	Greliave	[-83.25, -9.30]
Altair	[-2.00, 0.65]	Ophiuchi, 70	[-2.05, 0.00]	Beurcan	[79.65, -5.30]
Altair	[-2.00, 0.65]	Oltiqu	[-1.50, 3.95]	Quceve	[79.20, -9.80]
Altair	[-2.00, 0.65]	Ross 154	[-1.10, -0.30]	Hoenve	[-61.00, -55.85]
Altair	[-2.00, 0.65]	Sol	[0.00, 0.20]	Fasove	[-18.70, -79.40]

From	Coord	To	Coord	Via	Coord
Altair	[-2.00, 0.65]	Tau Ceti	[0.30, 0.40]	Phiwaze	[-9.80, -80.70]
Altair	[-2.00, 0.65]	Tiancan	[4.35, -5.15]	Anququ	[-53.75, -62.70]
Altair	[-2.00, 0.65]	Vega	[-2.60, 1.80]	Soanden	[70.20, 39.05]
Altair	[-2.00, 0.65]	Wolf 630	[-2.20, -0.75]	Grecaneth	[78.70, -11.95]
Anacka	[3.75, -3.70]	Tau Ceti	[0.30, 0.40]	Faqua	[64.55, 51.10]
Anacketh	[0.05, -5.00]	Tau Ceti	[0.30, 0.40]	Besoso	[-81.45, 1.85]
Andcefa	[1.55, -3.15]	Sol	[0.00, 0.20]	Zephila	[74.80, 33.30]
Andcefa	[1.55, -3.15]	Tau Ceti	[0.30, 0.40]	Cemiho	[77.90, 25.95]
Andinol	[2.90, -6.50]	Tau Ceti	[0.30, 0.40]	Cemiho	[77.90, 25.95]
Anlaol	[1.40, -6.00]	Eta Cassiopeia	[0.00, 2.50]	Greence	[-80.10, -15.05]
Anlaol	[1.40, -6.00]	Ross 128	[0.30, -0.40]	Exedze	[81.05, 12.85]
Anlaol	[1.40, -6.00]	Sol	[0.00, 0.20]	Ceioho	[80.45, 15.20]
Anlaol	[1.40, -6.00]	Tau Ceti	[0.30, 0.40]	Waethwa	[81.45, 10.80]
Anphiex	[1.60, -1.65]	Sol	[0.00, 0.20]	Waayan	[62.65, 52.65]
Arcturus	[-1.50, -0.50]	Barnard	[-0.75, 0.10]	Ethaso	[50.15, -63.85]
Arcturus	[-1.50, -0.50]	BD 946	[-0.70, 1.65]	Zeexce	[-77.75, 29.20]
Arcturus	[-1.50, -0.50]	Delta Pavonis	[-0.90, -1.70]	Anbeda	[72.60, 34.40]
Arcturus	[-1.50, -0.50]	Epsilon Indi	[-0.50, -0.65]	Tiesswa	[-13.15, -81.53]
Arcturus	[-1.50, -0.50]	Ophiuchi, 70	[-2.05, 0.00]	Esseuve	[-56.65, -60.85]
Arcturus	[-1.50, -0.50]	Sol	[0.00, 0.20]	Zecanmi	[33.60, -74.40]
Arcturus	[-1.50, -0.50]	Tau Ceti	[0.30, 0.40]	Anayce	[-37.60, 72.85]
Arcturus	[-1.50, -0.50]	Vega	[-2.60, 1.80]	Faenex	[-75.70, -34.70]
Arcturus	[-1.50, -0.50]	Wolf 630	[-2.20, -0.75]	Tiexex	[-29.40, 76.45]
Ayarlia	[3.15, 0.65]	Sol	[0.00, 0.20]	Tiayho	[12.50, -80.70]
Ayarlia	[3.15, 0.65]	Sophilia	[3.20, -1.35]	Grewalia	[-78.60, -2.65]
Ayfati	[1.35, -5.30]	Tau Ceti	[0.30, 0.40]	Exedze	[81.05, 12.85]
Aymiay	[0.90, 4.25]	Eta Cassiopeia	[0.00, 2.50]	Ayaen	[73.20, -34.00]
Aymifa	[1.55, -5.20]	Sol	[0.00, 0.20]	Uracka	[79.25, 19.80]
Aymifa	[1.55, -5.20]	Tau Ceti	[0.30, 0.40]	Essandeth	[-78.85, -20.00]
Aymigre	[2.10, -2.85]	Tau Ceti	[0.30, 0.40]	Ackackar	[72.60, 38.50]
Ayqugre	[3.70, -5.20]	Tau Ceti	[0.30, 0.40]	Tilaze	[-137.45, -87.40]
Ayurso	[3.80, -0.50]	Tau Ceti	[0.30, 0.40]	Waackio	[23.80, 78.75]
Barnard	[-0.75, 0.10]	Beta Hydri	[-0.10, -1.80]	Olmieth	[77.00, 25.95]
Barnard	[-0.75, 0.10]	Delta Pavonis	[-0.90, -1.70]	Urgreol	[-82.25, 5.60]
Barnard	[-0.75, 0.10]	Eta Cassiopeia	[0.00, 2.50]	Aylaeth	[77.85, -22.75]
Barnard	[-0.75, 0.10]	Fomalhaut	[-1.15, -0.10]	Arethwa	[35.15, -73.40]
Barnard	[-0.75, 0.10]	Ross 154	[-1.10, -0.30]	Ethiool	[-62.40, 53.95]
Barnard	[-0.75, 0.10]	Sol	[0.00, 0.20]	Hoessho	[11.05, -80.85]
Barnard	[-0.75, 0.10]	Tau Ceti	[0.30, 0.40]	Ackphied	[21.60, -78.70]
Barnard	[-0.75, 0.10]	Wolf 359	[0.40, -0.15]	Liagrelia	[-17.80, -79.90]
Bedaho	[-4.20, -1.50]	Sol	[0.00, 0.20]	Edphibe	[-33.20, 75.00]
Bedaho	[-4.20, -1.50]	Wolf 630	[-2.20, -0.75]	Beessbe	[-31.65, 75.40]
Behoqu	[2.10, -4.40]	Eta Cassiopeia	[0.00, 2.50]	Tiliada	[79.65, 22.20]
Behoqu	[2.10, -4.40]	Sol	[0.00, 0.20]	Laandlia	[75.40, 31.80]
Behoqu	[2.10, -4.40]	Tau Ceti	[0.30, 0.40]	Veingre	[-75.10, -31.30]
Beta Hydri	[-0.10, -1.80]	Luyten 674-15	[2.10, -1.00]	Ackdawa	[-27.20, 75.30]
Beta Hydri	[-0.10, -1.80]	Tau Ceti	[0.30, 0.40]	Phigreay	[80.60, -15.05]
Beta Hydri	[-0.10, -1.80]	Wolf 630	[-2.20, -0.75]	Sophimi	[35.45, 72.15]
Beta Lyrae	[-146.20, 85.20]	Sol	[0.00, 0.20]	Vewaay	[-143.40, -78.40]
Betelgeuse	[58.85, 13.75]	Sol	[0.00, 0.20]	Aredcan	[12.10, 81.15]
Beuress	[-0.35, -5.40]	Tau Ceti	[0.30, 0.40]	Hoinqu	[81.10, -12.10]

From	Coord	To	Coord	Via	Coord
Beurqu	[2.90, -5.00]	Tau Ceti	[0.30, 0.40]	Phiveay	[75.40, 32.70]
Bewaack	[-0.50, -5.15]	Tau Ceti	[0.30, 0.40]	Liaethlia	[-80.95, 8.90]
CD-37°15492	[-0.30, -0.20]	Lalande 21185	[0.35, 0.30]	Labeex	[50.15, -64.65]
CD-37°15492	[-0.30, -0.20]	Ross 128	[0.30, -0.40]	Greurmi	[-25.10, -78.10]
CD-37°15492	[-0.30, -0.20]	Sol	[0.00, 0.20]	Zeurce	[65.40, -49.15]
CD-46°11540	[-1.20, -1.30]	Sol	[0.00, 0.20]	Sodabe	[63.15, -51.75]
Canayce	[2.30, -6.30]	Sol	[0.00, 0.20]	Ququfa	[78.50, 23.85]
Canayce	[2.30, -6.30]	Tau Ceti	[0.30, 0.40]	Edacka	[-77.00, -26.25]
Candaess	[2.05, -4.25]	Eta Cassiopeia	[0.00, 2.50]	Tiliada	[79.65, 22.20]
Candaess	[2.05, -4.25]	Liabeze	[1.60, -4.20]	Hoyaze	[10.25, 77.20]
Candaess	[2.05, -4.25]	Sol	[0.00, 0.20]	Laandlia	[75.40, 31.80]
Candaess	[2.05, -4.25]	Tau Ceti	[0.30, 0.40]	Beackwe	[-75.20, -31.15]
Candaess	[2.05, -4.25]	Tau Ceti	[0.30, 0.40]	Veingre	[-75.10, -31.30]
Caninve	[2.50, -2.30]	Tau Ceti	[0.30, 0.40]	Grewaho	[-61.80, -52.70]
Ceessze	[3.30, -3.65]	Tau Ceti	[0.30, 0.40]	Hoessar	[-63.95, -50.15]
Cemiess	[-1.50, -2.50]	Phekda	[1.50, 5.00]	Exdain	[-75.80, 31.70]
Cemiess	[-1.50, -2.50]	Sol	[0.00, 0.20]	Uressmi	[70.10, -41.90]
Cetilia	[4.15, -4.90]	Sol	[0.00, 0.20]	Dalaqu	[65.35, 49.20]
Cetilia	[4.15, -4.90]	Tau Ceti	[0.30, 0.40]	Tizeay	[68.20, 45.85]
Cygni, 61	[-0.90, 1.20]	Epsilon Indi	[-0.50, -0.65]	Zecephi	[79.15, 17.50]
Cygni, 61	[-0.90, 1.20]	Ross 154	[-1.10, -0.30]	Andolda	[-82.10, 10.75]
Cygni, 61	[-0.90, 1.20]	Sol	[0.00, 0.20]	Laackho	[-61.20, -54.05]
Cygni, 61	[-0.90, 1.20]	Tau Ceti	[0.30, 0.40]	Philaso	[45.30, 68.65]
Daceess	[2.15, -4.55]	Sol	[0.00, 0.20]	Laandlia	[75.40, 31.80]
Daceess	[2.15, -4.55]	Tau Ceti	[0.30, 0.40]	Essessze	[77.90, 26.10]
Dainay	[1.60, 2.95]	Exhoed	[1.95, 4.00]	Inayphi	[-75.90, 29.30]
Dainay	[1.60, 2.95]	Phekda	[1.50, 5.00]	Veethphi	[-80.35, 0.25]
Dainay	[1.60, 2.95]	Ross 986	[1.85, 1.35]	Olcanen	[81.50, 14.70]
Dainay	[1.60, 2.95]	Sol	[0.00, 0.20]	Edzemi	[71.40, -39.85]
Dainfa	[3.15, -6.45]	Tau Ceti	[0.30, 0.40]	Inbeex	[77.35, 27.85]
Delta Pavonis	[-0.90, -1.70]	Epsilon Indi	[-0.50, -0.65]	Andzeand	[75.75, -30.45]
Delta Pavonis	[-0.90, -1.70]	Exioce	[-0.60, -2.90]	Bequan	[78.70, 17.75]
Delta Pavonis	[-0.90, -1.70]	Luyten 205-128	[-1.25, -1.80]	Mizece	[21.25, -80.30]
Delta Pavonis	[-0.90, -1.70]	Quexce	[-1.60, -1.80]	Bedaqu	[-13.40, 79.20]
Delta Pavonis	[-0.90, -1.70]	Ross 128	[0.30, -0.40]	Haethda	[59.90, -56.60]
Delta Pavonis	[-0.90, -1.70]	Ross 986	[1.85, 1.35]	Inphiur	[61.25, -55.00]
Delta Pavonis	[-0.90, -1.70]	Sol	[0.00, 0.20]	Tiinay	[-75.20, 32.45]
Edethex	[3.25, -2.95]	Sol	[0.00, 0.20]	Tisophi	[-55.35, -60.10]
Edethex	[3.25, -2.95]	Tau Ceti	[0.30, 0.40]	Begreho	[-59.65, -55.30]
Edlave	[2.95, -1.95]	Sol	[0.00, 0.20]	Latifa	[-46.65, -66.95]
Edlave	[2.95, -1.95]	Tau Ceti	[0.30, 0.40]	Laessay	[55.85, 60.35]
Encea	[-1.90, 2.05]	Eta Cassiopeia	[0.00, 2.50]	Inolack	[-20.05, 81.90]
Enquze	[4.45, -2.80]	Tau Ceti	[0.30, 0.40]	Candalia	[102.25, 128.05]
Epsilon Eridani	[0.90, 0.30]	Luyten 97-12	[0.90, -1.95]	Urgrebe	[82.60, -0.60]
Epsilon Eridani	[0.90, 0.30]	Ross 128	[0.30, -0.40]	Arethur	[62.80, -53.30]
Epsilon Eridani	[0.90, 0.30]	YZ Canis Minoris	[2.25, 0.05]	Olwada	[16.70, 80.70]
Epsilon Eridani	[0.90, 0.30]	Zeanlia	[1.60, 1.95]	Iozebe	[76.55, -30.70]
Epsilon Indi	[-0.50, -0.65]	Quexce	[-1.60, -1.80]	Iophice	[-60.25, 55.40]
Epsilon Indi	[-0.50, -0.65]	Sol	[0.00, 0.20]	Uressmi	[70.10, -41.90]
Eridani, 82	[1.10, -0.70]	Ross 154	[-1.10, -0.30]	Edbeeth	[15.10, 79.95]
Eridani, 82	[1.10, -0.70]	Sirius	[1.05, -0.15]	Laayqu	[82.40, 6.85]

From	Coord	To	Coord	Via	Coord
Essaa	[0.95, -4.90]	Tau Ceti	[0.30, 0.40]	Ayliaur	[81.80, 7.35]
Essliagre	[2.40, -3.75]	Sol	[0.00, 0.20]	Greolar	[70.95, 40.80]
Essliagre	[2.40, -3.75]	Tau Ceti	[0.30, 0.40]	Canvefa	[-71.30, -39.10]
Eta Cassiopeia	[0.00, 2.50]	Fomalhaut	[-1.15, -0.10]	Enaed	[74.40, -31.65]
Eta Cassiopeia	[0.00, 2.50]	Ioioqu	[3.85, -4.60]	Ethcanphi	[-70.00, -39.65]
Eta Cassiopeia	[0.00, 2.50]	Lalande 25372	[-0.45, -0.25]	Cearce	[80.40, -11.95]
Eta Cassiopeia	[0.00, 2.50]	Liabeze	[1.60, -4.20]	Essandeth	[-78.85, -20.00]
Eta Cassiopeia	[0.00, 2.50]	Liaququ	[2.35, -2.40]	Arayess	[74.80, 35.40]
Eta Cassiopeia	[0.00, 2.50]	Miolze	[2.20, -2.65]	Aressfa	[-74.10, -32.20]
Eta Cassiopeia	[0.00, 2.50]	Oltiqu	[-1.50, 3.95]	Inenda	[56.10, 62.00]
Eta Cassiopeia	[0.00, 2.50]	Ross 986	[1.85, 1.35]	Liafaze	[-42.10, -67.75]
Eta Cassiopeia	[0.00, 2.50]	Sol	[0.00, 0.20]	Faenol	[-81.85, 0.85]
Eta Cassiopeia	[0.00, 2.50]	Tau Ceti	[0.30, 0.40]	Exedze	[81.05, 12.85]
Ethgrece	[1.95, -4.75]	Tau Ceti	[0.30, 0.40]	Hoceed	[78.90, 22.85]
Exbephi	[-1224.85, -852.90]	Tau Ceti	[0.30, 0.40]	Aeda	[-801.40, -154.55]
Exbeur	[-3.40, 3.85]	Vega	[-2.60, 1.80]	Beinfa	[-79.20, -26.75]
Exiool	[1.95, -3.75]	Sol	[0.00, 0.20]	Micanack	[74.35, 34.25]
Exiool	[1.95, -3.75]	Tau Ceti	[0.30, 0.40]	Arvephi	[-74.80, -32.05]
Exiool	[1.95, -3.75]	Vega	[-2.60, 1.80]	Laphiess	[62.40, 51.35]
Facece	[0.30, -4.05]	Sohoa	[0.30, -3.65]	Andliafa	[82.05, -3.60]
Facece	[0.30, -4.05]	Sol	[0.00, 0.20]	Phiedur	[82.30, 3.75]
Facece	[0.30, -4.05]	Tau Ceti	[0.30, 0.40]	Laarar	[-81.35, -1.80]
Facece	[0.30, -4.05]	Vequess	[-0.40, -4.15]	Lafacan	[-11.80, 76.85]
Famiso	[3.35, -4.25]	Tau Ceti	[0.30, 0.40]	Entiar	[70.05, 43.20]
Faphiwe	[2.50, -4.30]	Tau Ceti	[0.30, 0.40]	Phiveay	[75.40, 32.70]
Fawaol	[2.45, -2.65]	Sol	[0.00, 0.20]	Betila	[63.25, 52.05]
Fawaol	[2.45, -2.65]	Tau Ceti	[0.30, 0.40]	Vequcan	[-65.65, -48.00]
Fomalhaut	[-1.15, -0.10]	Luyten 205-128	[-1.25, -1.80]	Lasocan	[-82.80, 3.80]
Fomalhaut	[-1.15, -0.10]	Ross 154	[-1.10, -0.30]	Lacanfa	[78.20, 19.80]
Fomalhaut	[-1.15, -0.10]	Sol	[0.00, 0.20]	Ensoda	[-21.25, 79.20]
Greayqu	[3.15, -2.35]	Tau Ceti	[0.30, 0.40]	Enqugre	[-54.85, -59.90]
Gretiay	[3.15, 1.70]	Tau Ceti	[0.30, 0.40]	Aexar	[-32.55, 75.65]
Hobegre	[2.45, -5.55]	Tau Ceti	[0.30, 0.40]	Qulaur	[78.15, 25.35]
Hocancan	[1.50, -3.00]	Intiol	[1.90, -4.00]	Zedaar	[-74.20, -33.80]
Hocancan	[1.50, -3.00]	Sol	[0.00, 0.20]	Zephila	[74.80, 33.30]
Hocancan	[1.50, -3.00]	Tau Ceti	[0.30, 0.40]	Cemiho	[77.90, 25.95]
Hoethcan	[3.50, -4.90]	Sol	[0.00, 0.20]	Zelati	[68.95, 44.10]
Hoethcan	[3.50, -4.90]	Tau Ceti	[0.30, 0.40]	Hoquso	[141.65, 82.45]
Inedol	[3.20, -4.60]	Tau Ceti	[0.30, 0.40]	Ayquar	[72.35, 39.20]
Inena	[3.40, -6.45]	Tau Ceti	[0.30, 0.40]	Zemive	[-72.70, -36.60]
Intiol	[1.90, -4.00]	LP 658-2	[2.35, 0.25]	Behoar	[83.55, -9.45]
Intiol	[1.90, -4.00]	Sol	[0.00, 0.20]	Laandlia	[75.40, 31.80]
Intiol	[1.90, -4.00]	Tau Ceti	[0.30, 0.40]	Essessze	[77.90, 26.10]
Ioarqu	[1.90, -2.80]	Tau Ceti	[0.30, 0.40]	Arcear	[-71.85, -38.15]
Ioioqu	[3.85, -4.60]	Sol	[0.00, 0.20]	Arioand	[-62.30, -52.85]
Ioliaa	[1.55, -6.20]	Tau Ceti	[0.30, 0.40]	Exedze	[81.05, 12.85]
Ioququ	[2.80, -3.60]	Tau Ceti	[0.30, 0.40]	Zeayur	[70.80, 41.70]
Iozegre	[3.15, -2.30]	Tau Ceti	[0.30, 0.40]	Phiedda	[-54.35, -60.35]
LP 658-2	[2.35, 0.25]	Sol	[0.00, 0.20]	Edbear	[3.15, -81.60]
Lacancan	[3.40, -6.05]	Tau Ceti	[0.30, 0.40]	Phiveay	[75.40, 32.70]
Laedgre	[2.00, -2.10]	Tau Ceti	[0.30, 0.40]	Canveol	[68.90, 44.90]

From	Coord	To	Coord	Via	Coord
Laesscan	[3.85, -2.60]	Tau Ceti	[0.30, 0.40]	Anessur	[-103.30, -125.95]
Laiogre	[4.35, -4.30]	Tau Ceti	[0.30, 0.40]	Begreho	[-59.65, -55.30]
Lalande 21185	[0.35, 0.30]	Ross 128	[0.30, -0.40]	Miurar	[81.95, -5.15]
Lalande 21185	[0.35, 0.30]	Tau Ceti	[0.30, 0.40]	Auray	[73.20, 37.40]
Lalande 25372	[-0.45, -0.25]	Tau Ceti	[0.30, 0.40]	Falaa	[-53.60, 61.90]
Liabeze	[1.60, -4.20]	Sol	[0.00, 0.20]	Ededeth	[77.60, 25.90]
Liabeze	[1.60, -4.20]	Tau Ceti	[0.30, 0.40]	Ioioack	[-77.80, -23.90]
Liaququ	[2.35, -2.40]	Sol	[0.00, 0.20]	Phiayand	[-59.40, -55.90]
Liaququ	[2.35, -2.40]	Tau Ceti	[0.30, 0.40]	Olveve	[-65.10, -48.75]
Luyten 97-12	[0.90, -1.95]	Ross 128	[0.30, -0.40]	Laceti	[76.90, 28.10]
Luyten 97-12	[0.90, -1.95]	Sol	[0.00, 0.20]	Beanfa	[-74.70, -32.90]
Luyten 97-12	[0.90, -1.95]	Tau Ceti	[0.30, 0.40]	Argreed	[-78.65, -20.80]
Luyten 674-15	[2.10, -1.00]	Maanens, van	[-0.05, 1.10]	Miolfa	[-56.20, -58.40]
Luyten 674-15	[2.10, -1.00]	Sol	[0.00, 0.20]	Edexed	[-39.60, -71.35]
Luyten 674-15	[2.10, -1.00]	Sophilia	[3.20, -1.35]	Enhove	[-21.35, -79.35]
Luyten 674-15	[2.10, -1.00]	YZ Canis Minoris	[2.25, 0.05]	Ceioeth	[83.25, -12.10]
Miandze	[2.60, -5.35]	Sol	[0.00, 0.20]	Ioayess	[-72.75, -37.05]
Miandze	[2.60, -5.35]	Tau Ceti	[0.30, 0.40]	Inbeex	[77.35, 27.85]
Micanex	[2.75, -4.30]	Sol	[0.00, 0.20]	Zequess	[71.05, 40.70]
Miolgre	[2.10, -4.65]	Tau Ceti	[0.30, 0.40]	Qulaur	[78.15, 25.35]
Miolze	[2.20, -2.65]	Tau Ceti	[0.30, 0.40]	Arlada	[70.50, 42.45]
Olaygre	[3.95, -3.50]	Tau Ceti	[0.30, 0.40]	Inquol	[62.15, 53.95]
Ollaex	[1.95, -2.95]	Tau Ceti	[0.30, 0.40]	Urayda	[74.60, 34.50]
Ophiuchi, 36	[-1.80, -1.15]	Sol	[0.00, 0.20]	Enbeay	[-50.15, 64.85]
Phekda	[1.50, 5.00]	Sol	[0.00, 0.20]	Esszeand	[78.70, -22.10]
Phiagre	[0.85, -2.65]	Tau Ceti	[0.30, 0.40]	Tisoess	[-79.95, -15.35]
Ross 128	[0.30, -0.40]	Omicron Eridani	[1.50, 0.45]	Mienio	[47.95, -66.90]
Ross 128	[0.30, -0.40]	Sol	[0.00, 0.20]	Hoarti	[73.40, 36.45]
Ross 128	[0.30, -0.40]	Tau Ceti	[0.30, 0.40]	Eddafa	[82.20, -0.25]
Ross 154	[-1.10, -0.30]	Sol	[0.00, 0.20]	Zecanmi	[33.60, -74.40]
Ross 154	[-1.10, -0.30]	Tau Ceti	[0.30, 0.40]	Anayce	[-37.60, 72.85]
Ross 986	[1.85, 1.35]	Sol	[0.00, 0.20]	Waave	[43.75, -68.90]
Ross 986	[1.85, 1.35]	Tau Ceti	[0.30, 0.40]	Hoolti	[-41.80, 70.50]
Sirius	[1.05, -0.15]	Sol	[0.00, 0.20]	Cecanlia	[-25.00, -77.75]
Sodaack	[1.30, -5.60]	Tau Ceti	[0.30, 0.40]	Waethwa	[81.45, 10.80]
Sohoa	[0.30, -3.65]	Sol	[0.00, 0.20]	Exedce	[81.70, 4.50]
Sohoa	[0.30, -3.65]	Tau Ceti	[0.30, 0.40]	Hovea	[82.00, -1.65]
Sohoa	[0.30, -3.65]	Vequess	[-0.40, -4.15]	Liaandex	[46.85, -70.85]
Sol	[0.00, 0.20]	Sophilia	[3.20, -1.35]	Ceessess	[-33.90, -74.25]
Sol	[0.00, 0.20]	Tau Ceti	[0.30, 0.40]	Edbeur	[-68.05, 45.40]
Sol	[0.00, 0.20]	Tivecan	[2.30, -3.45]	Canedand	[-67.85, -45.55]
Sol	[0.00, 0.20]	Vequess	[-0.40, -4.15]	Iocanwa	[81.15, -9.75]
Sol	[0.00, 0.20]	Waolex	[3.60, -4.35]	Arioay	[65.95, 48.45]
Sol	[0.00, 0.20]	Wolf 630	[-2.20, -0.75]	Zeliaur	[31.25, -75.35]
Sol	[0.00, 0.20]	Zeancan	[1.55, -2.00]	Bemiio	[-66.35, -47.60]
Tau Ceti	[0.30, 0.40]	Tiacan	[2.85, -3.50]	Ackgreho	[-66.85, -46.30]
Tau Ceti	[0.30, 0.40]	Tiancan	[4.35, -5.15]	Ollaan	[68.40, 45.75]
Tau Ceti	[0.30, 0.40]	Tiessgre	[2.70, -3.45]	Zeayur	[70.80, 41.75]
Tau Ceti	[0.30, 0.40]	Tivecan	[2.30, -3.45]	Anmiay	[73.80, 36.15]
Tau Ceti	[0.30, 0.40]	Urlaay	[3.15, -2.35]	Enqugre	[-54.85, -59.90]
Tau Ceti	[0.30, 0.40]	Urquay	[4.30, -5.10]	Zesoand	[-63.75, -50.40]

From	Coord	To	Coord	Via	Coord
Tau Ceti	[0.30, 0.40]	Veareth	[0.00, -4.65]	Arquho	[81.70, -6.70]
Tau Ceti	[0.30, 0.40]	Vecanlia	[0.00, -5.00]	Arquho	[81.70, -6.70]
Tau Ceti	[0.30, 0.40]	Vequess	[-0.40, -4.15]	Laceti	[80.65, -14.45]
Tau Ceti	[0.30, 0.40]	Waarze	[3.85, -4.35]	Enengre	[-63.65, -50.70]
Tau Ceti	[0.30, 0.40]	Waayol	[3.95, -5.15]	Arlada	[70.50, 42.45]
Tau Ceti	[0.30, 0.40]	Waceol	[2.75, -3.55]	Canquar	[70.85, 41.65]
Tau Ceti	[0.30, 0.40]	Waessol	[1.70, -3.35]	Zeceeth	[77.65, 27.20]
Tau Ceti	[0.30, 0.40]	Wainze	[3.45, -1.70]	Hoexho	[47.40, 67.30]
Tau Ceti	[0.30, 0.40]	Zeaex	[3.35, -1.70]	Quayho	[48.05, 66.70]
Tau Ceti	[0.30, 0.40]	Zeessze	[-0.30, 2.75]	Phitiay	[-79.20, -18.65]
Tau Ceti	[0.30, 0.40]	Zeessze	[0.75, -5.70]	Veexio	[-162.35, -14.60]