

NanoTrasen Incorporated

Orbital Plasma Research Facilities

General Handbook

Engineers and Atmospheric Technicians

Version 5, June 2554

Stations 9 – 13

NOTE: This handbook does not include information on the singularity power generation device currently being designed at the time of this writing. It is expected that this device “Singularity Engine” will be in experimental use on as-yet unknown selected stations within the next six months, with its own documentation. Engineers on these station are advised to seek additional instruction.

THIS COPY NOT TO LEAVE ENGINEERING LOCKER ROOM

Part no. E-(99)-1-5 (Handbook/Manual)

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Terminology

This handbook uses the FAAE (“Fay”) Grouping for the collection of materials colloquially known as “Plasma”. Engineers are encouraged to use the proper terminology when referring to these materials to avoid confusion between its different states.

The most commonly used and researched state, Quasi-gaseous Faddeev-Poppov Anhydrous polyneutronic Anomalous Evaporate Construct, is to be referred to as QG-FAAE-C or FAAE-1.

Use SF-FAAE-C or FAAE-2 (Superfluidic FAAE Construct) for the material used in modern cryogenics and welding.

Use S-FAAE-Com or FAAE-Com (Solid-State FAAE-Derived Composite) for the material used in the construction and manufacture of certain items and materials. For obvious reasons, you will not encounter this material in an unprocessed form, S-FAAE-C, or FAAE-3.

Units of measurement

NanoTrasen uses the kilopascal (kPa) and Kelvin (K) units, in keeping with global standards. Any engineer known to be using obsolete or unproven units of measurement is endangering themselves and others, and will be subject to disciplinary action.

SAFETY ON SITE

All Engineers are required to report to the Chief Engineer when coming onto the station, at once after reporting to the Head Of Personnel. You will be shown the engineering locker room where you will be outfitted. While on duty, you MUST wear the following items, which can be found in your locker:

1. Optical Meson Scanner (Engineers Only)– Exploits the detectable instability of quarks and anti-quarks to detect atomic excitement of or absence of material beyond the natural sight of the wearer. This can be used to “see” hazards in rooms before they are entered, such as fires, toxic material spills, and hull breaches. Two arrays of super-activated FAAE-Com of molecular thinness are separated by a chamber of FAAE-1 lined with platinum. The resulting decay is processed by a microchip in the frame. OMSs are passive devices which require no power source, the only part requiring power derives it from the decay of the FAAE-1. OMSs degrade with time, not use, and must be replaced every 6 months regardless of usage.
2. Jumpsuit and shoes with appropriate markings – Designed for increased visibility on site and durability. Catches on back allow for attachment of a backpack or a full-size O2 or Air Mix tank.
3. Insulated Gloves (Engineering only)– Protection from high current. Must be worn even if work is not of an electrical nature. Advanced Polytetrafluoroethylene (PTFE) web provides resistivity of $\sim 10^{25} \Omega$, able to resist the entire current of the station's solar arrays for limited amounts of time.
4. Hard hat. (Engineering only)
5. Hard-sealed gas mask with activated charcoal filter. Filter must be replaced every month, or immediately in the case of exposure to airborne pollutants. A breath mask is not adequate protection and is only to be used in emergencies where your gas mask has been lost or is unusable.

In addition, for certain situations the following must be worn:

Fire - Green-rated Fire Proximity Suit. Complete coverage vacuum-deposited aluminized jacket, trousers and hood allow for exposure to high temperatures for limited periods. Does not protect from vacuum. Located in atmospherics and in maintenance shafts – See map for specific locations.

Vacuum Exposure – NanoTrasen space suit with helmet. One is located in engineering for hull breach repair and access to the engine site, others can be obtained on request from EVA. (See General Crew Handbook – Access and Restrictions)

Welding – A welding helmet must be worn while welding. Space helmets also provide adequate protection. Do not perform welding without a helmet. NEVER WELD WHILE WEARING THERMAL GOGGLES.

Internal Atmospheres consisting of a full-size O2 or Air Mix tank are to be used when working in areas which have or are suspected to have inadequate atmosphere. Some engineers have been found to be using a full tank at all times while working, but this depletes reserves faster and increases the amount of labour required for tank replacement. The cost of replacement for wasted tanks will be deducted from the collective pay of station engineers.

If an internal atmosphere is required:

1. If possible, while setting internals remain in an area with an adequate atmosphere.
2. Find the Attachment Tubing Release Trigger on your tank. On full-size tanks, this is located at the top below the release valve. On smaller emergency tanks, it is located on the side, although the tubing will still emerge from the top.
3. Take the tubing from the top of the tank and push it firmly into the round cavity on the right side of the mask until a click is heard. The left side of your mask contains filter material, do not remove this. If you are using an emergency breath mask, the cavity is located on the bottom of the mask. Do not rotate the tubing in the cavity, this will switch you from external to internal atmosphere before the release valve is open.
4. Open the release valve located at the top of the tank. A small display will indicate the Tank Pressure and the Distribution Pressure. The TP should be greater than the DP. If they are equal, find a different tank as soon as possible. Unless it is unsafe to do so, detach and discard the tank.
5. Rotate the tubing clockwise in the cavity on your mask until the mask tightens on your face. This is automatic.
6. Attach the tank to the catches on the back of your jumpsuit at once, or to your belt if you are using an emergency tank. NEVER carry the tank in your hand, as a slip will cause it to detach from or even pull off your mask.
7. Continue to check the tank pressure at intervals.

Safety and FAAE-1

FAAE-1 is an extremely volatile and hazardous material, about which much is not yet understood. An unacceptable number of accidents and injuries are caused by improper handling of FAAE-1. The latest engineering areas utilize the material as little as possible, but you may be tasked with handling it elsewhere. The following standards must always be followed:

FAAE-1 TANKS ARE ORANGE AND MUST BE MARKED WITH CLEAR BIOHAZARD WARNINGS.

BEFORE TRANSPORTING LARGE CANISTERS OF FAAE-1, INFORM STATION SECURITY OF YOUR INTENTIONS AND ARRANGE FOR AN ESCORT.

ALWAYS WEAR AN INTERNAL ATMOSPHERE AND GLOVES WHEN HANDLING FAAE-1, EVEN IN SEALED CONTAINERS.

SOUND THE ALARM FOR EVERY SPILLAGE OR LEAK, HOWEVER SMALL.

ATMOSPHERIC TECHNICIANS MUST TAKE ACTION TO CLEAN LEAKS AS SOON AS THE ALARM IS RAISED, BY USING AIR SCRUBBERS AND THE PANIC SIPHON SYSTEM.

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NEVER OPEN THE RELEASE (TOP) VALVE OF A CANISTER WITHOUT GOOD REASON AND AN EVACUATED AREA.

NEVER USE A NAKED FLAME AROUND FAAE-1.

THE SMALL TANKS OF FAAE-1 IN THE ENGINEERING TANK STORAGE UNIT ARE INTENDED FOR USE IN THE CURRENTLY DELAYED ENGINE. THESE ARE NEVER TO LEAVE ENGINEERING

NEVER FILL A FAAE-1 TANK WITH ANYTHING OTHER THAN FAAE-1.

NEVER FILL TANKS UNMARKED FOR FAAE-1 WITH FAAE-1.

IMPROPER HANDLING OF FAAE-1 IS AN EMPLOYMENT TERMINATION OFFENCE.

IF THERE IS A SPILL OR LEAK, REMEMBER WHAT A.I.L.S. YOU

A – ALARM must be sounded across the radio on frequency 145.9.

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I – INTERNALS must be worn if not already.

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L – LOCKDOWN the area so that the leak can be contained and evacuate non-essential personnel.

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S – SCRUB the air in the area until no trace of FAAE-1 remains. Use the atmospheric scan feature on your PDA, or Local Atmospheric Monitors. Do NOT rely on visually perceiving the leak.

If a spill is too large to clean and the panic siphon has proved ineffective, lock down the area and contact Central Command.

Never take unnecessary risks. No equipment is worth your life.

Your Tools

Tools that can be carried by you or on your person. For fixed-place equipment and computers, see next section.

In alphabetical order

ANALYZER:

Contained in a MECHANICAL TOOLBOX (Blue), although older toolboxes only contain an atmospheric analyser.

Essentially a very small mass spectrometer that takes a small sample of the atmosphere in its immediate proximity and finds the proportions using the counterflow principle. This device is known to give erratic readings in very low pressure environments. It is tailor-made for NanoTrasen stations and is not designed to find gases or particles not usually found in a station environment. Any such aberrations will appear as “other” on the display. It is the only item in the blue toolbox that will not fit in a UTILITY BELT.

To use, hold away from the body and ensure you are not covering the scan port. Press “Scan”. Your result should appear on the display instantly. Results are only applicable in immediate proximity, use results with caution. Can also be placed against large canisters, where it will interface with the passive technology in the canister, and provide a reading for the gas within, as well as the pressure said gas is under.

CABLE:

Contained in an ELECTRICAL TOOLBOX (YELLOW), extra supplies to be kept in Maintenance Storage, Tech Storage and EVA Storage.

Heavy PTFE-web insulator surrounding a silver alloy wire designed for withstanding extremely high current. Both insulator and wire are impregnated with retro-activated FAAE-Com. Packaged in coils consisting of several feet of cable (Exact quantity varies by station, consult quartermaster for records).

The innovation of retro-activated FAAE-Com has made the process of placing cables very simple. Press two exposed ends of cable (WEAR INSULATED GLOVES) together hard for 5-10 seconds until the warmth that is felt subsides and a slight bulging is observed. This seal is as the wire had always been attached, save from the slight bulging of the insulation material. Though attaching new segments of cable is simple, wires cannot be broken by hand due to the strong seal caused of the degrading of FAAE-Com, and you will need to use WIRECUTTERS. Although the insulation provided is very high, cables should not be left exposed outside of construction areas, maintenance shafts, and the engineering area as not all station personnel are trained to avoid damaging them. Remember to replace any plating that has been removed to repair cables.

CROWBAR:

Contained in a MECHANICAL TOOLBOX (BLUE) and an EMERGENCY TOOLBOX (RED).

A very useful tool which most Chief Engineers will demand all engineers and technicians carry at all times. Is the mandated tool for the removal of floor plating and for the forced entry of airlocks for which the power has failed. There is a tailor-made insertion point for this tool on a UTILITY BELT. In the event of a power outage, all station personnel should be issued with a crowbar in order to be able to enter rooms for which the airlock power has failed.

FIRE EXTINGUISHER:

Contained in an EMERGENCY TOOLBOX (RED).

A fire suppression device utilizing CO2 under high pressure.

Only to be used for fire suppression. The safety is located behind the handle. To use the extinguisher, first turn the safety off by turning it counter-clockwise while pulling. Point the hose at the BASE of the fire and squeeze the handle. After the fire is safely out, used extinguishers should be discarded and the quartermaster contacted for replacements.

FLASH LIGHT:

Contained in an EMERGENCY TOOLBOX (RED).

A flash light providing much greater illumination than that on a PDA.

Press switch once to turn on, and place in the centre of the room requiring illumination, or carry it upon your person for portable illumination.

MULTITOOL:

Located in the Electrical Supplies locker in Engineering, as well as various locations around the station. A commonly made tool in an autolathe.

A device that stores a small amount of electrical charge, and is designed to emulate the activity of a full circuit in such a way that any system it is attached to will behave as though the tool is a part of that system.

This is generally used to “spoof” a state change in a small system by taking a wire in the system, attaching the multitool by the spiked connectors at the top, and activating it. This will momentarily detach the wire from the main station circuit and connect it to the multitool, which will send the state change signal. This procedure is known as a “pulse”, as the connected systems flicker and reset when the multitool is attached and detached. Newer multitools have a display and can have their spiked connectors inserted into power cables, and will display the current passing through the cable.

PORTABLE AIR PUMP

Located in Atmospherics, as well as in Emergency Storage areas across the station.

A small pump which can store gas up to roughly 1000 kPa. It contains few complex parts and cannot distinguish between gases it takes in or lets out.

Always check pump direction before activating. The dial on the front of the pump casing can be set to the specific pressure that the pump should achieve. If you wish to empty the pump, set to 0 kPa. To use to pump to replenish air in an area, first activate it in an area where the air is plentiful. Set the pump direction to “In” and the pressure to max by turning the dial in the clockwise direction. When the display pressure matches the dial pressure, turn off the power and move the pump to the desired location. Set the pressure to 0 kPa and the direction to “Out”, then activate the pump. This method is relatively slow and should only be used for small replenishments. Larger replenishments should use an air canister. An air pump can also be used to aid in the clearing of hazardous or unwanted gas from a locale by taking it in. Air pumps have a port on their underside which can be attached to a connector port, though a WRENCH will be required to secure the bolts.

PORTABLE AIR SCRUBBER

Located in Atmospherics, as well as in Emergency Storage areas across the station.

A Dry Scrubbing device that uses a spray of primarily polytreptide with soda ash and a gold lattice to decontaminate air. A micro-encasement device separates, pumps and stores the gases within the scrubber – They are not dissolved in any way. The scrubber is specifically designed to be able to handle the removal of FAAE-1 from atmospheres. Scrubbers cannot be relied upon for removing airborne pathogens.

The operation of PASs is effectively the same to PAPs, but scrubbers will only contain contaminants. PASs should be deployed at the site of a gas leak as soon as they occur.

POWER CELL

Located in Engineering, Maintenance Storage, Tech Storage, and Robotics.

A lithium cell designed to draw power from the main station grid.

These cells are to be used either as a backup if station power should fail, or for powering cyborg constructs. They are not a primary power source. They can only be charged in specialised cell chargers. To charge a cell, place it within a charger ensuring that it is placed with the positive terminal on the positive side of the cell. A display on the charger will show its current charge. A cell is contained in every APC and will automatically charge from the power grid.

SCREWDRIVER

Contained in a MECHANICAL TOOLBOX (BLUE)

A screwdriver designed for optimum balance and efficiency of force. Contains rare-earth magnets to aid with the detective and removal of screws.

Screws are used in many station constructs. Engineers are advised to keep this on their UTILITY BELT at all times.

STATION BOUNCED RADIO

Contained in an EMERGENCY TOOLBOX (RED)

A larger, more robust version of a radio headset, these radios have no special function but can be used in the case of loss or destruction of one's radio headset.

TOOLBOXES

Found across station. Consult your map for specific locations.

Three varieties of toolbox exist.

MECHANICAL (BLUE):

- Crowbar
- Wrench
- Screwdriver
- Analyzer
- Welding Tool
- Wirecutters
-

ELECTRICAL (YELLOW)

- Three cable coils
- T-Ray Scanner
- Screwdriver
- Wirecutters

EMERGENCY (RED).

- Crowbar
- Fire Extinguisher
- Station bounced radio
- Flash light

Although toolboxes are designed to be carried, there have been an unacceptable number of accidents involving toolboxes. They are very heavy and can do serious harm to crew members if not carried and used sensibly. Please use caution and common sense.

T-RAY SCANNER

Contained in an ELECTRICAL TOOLBOX (Yellow)

Uses Terahertz Radiation to penetrate plating and detect the cabling and piping beneath. A projector on the bottom of the scanner projects an image of the infrastructure onto the appropriate walls or floor.

Invaluable for fixing broken wiring and pipes, the device must be held at arm's length away from the body, with the projector facing downwards.

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UTILITY BELT

Found in Engineering as well as EVA Storage

A high-capacity utility belt with ergonomic design, so that even a full toolbox's complement of tools will not slow down the wearer. Some Chief Engineers may insist all engineers wear a belt. Certain larger tools will not fit onto the belt safely.

WELDING TOOL

Contained in a MECHANICAL TOOLBOX (BLUE)

An oxy-fuel welder and cutter, using a FAAE-2/Acetylene mix as the fuel. This creates a weld with all the advantages of an arc weld, without the need for a power source.

Always ensure that a welding helmet is worn before welding. Never keep welding while not watching your weld. To activate, first hit the “On/Off” valve. This will start the fuel and oxygen flow, and automatically create a spark until ignition is detected. Direct welder to the desired join. For cutting, use the oxygen blast trigger to burn and blast the melted metal out of the cut. Welder Fuel tanks contain both the fuel mix and oxygen needed for the tool. Because the tool contains its own oxygen, it is possible to use one in a low- or zero-oxygen environment.

WIRECUTTERS

Contained in a MECHANICAL TOOLBOX (BLUE)

An extremely powerful pair of wirecutters, designed for an incredible amount of leverage. The cutting surface is plated with Beryllium copper alloy, a known retro-activator of FAAE-Com.

Generally these are standard wirecutters. When cutting power cables, the Beryllium copper plating retro-activates the FAAE-Com that impregnates the cable and its insulation, effectively reversing the process that seals it. The process is endothermic and very small ice crystals may be observed forming on the cutters. These can be safely wiped off with a glove. Note that due to fears about how it would effect the retro-activation, the wirecutters are not insulated fully and insulated gloves must be worn when using them.

WRENCH

Contained in a MECHANICAL TOOLBOX (BLUE)

A tool used to apply torque.

More commonly referred to as a spanner among veteran engineers, this is another invaluable, simple tool that is used in a very wide variety of station tasks.

YOUR WORK AREA

ATMOSPHERICS

Located to the fore of the engineering wing. One must pass a two-door airlock to enter.

It is accessible by:

- Captain, Head Of Security, Chief Engineer, and Head of Personnel
- Atmospheric Technicians

It is important that those without adequate ID are not allowed entry into the work area. Those attempting to gain access without a correct ID must be reported to security at once. A technician should always be present in the control room to observe atmospheric alerts via the computer, and to give or deny entry to those who enter the two-door airlock. It is perfectly possible and reasonable for a technician to deny entry to a crew member with correct ID, if they believe they are going to act irresponsibly in the area. An irresponsible crew member could cause a great deal of damage to the station if allowed into this room.

The main atmospheric room pumps a nitrogen/oxygen mix to the entirety of the station, and determines the proportion of that mix via various mixer controls. These are explained further in the next section.

To the fore of the main room are the PAPs and the PASs. To the aft is the canister room, containing ready canisters of various gases. The area contains two tank dispensers stocked with oxygen only. Upon entering the room one can see the racks, upon which lie technicians' fire suits and gas masks.

ENGINEERING

Located to the aft of the engineering wing. One must pass a two-door airlock to enter the main room, though the solar panel controls are outside of this.

It is accessible by:

- Captain, Head Of Security, Chief Engineer, and Head of Personnel
- Station Engineers
- Roboticists

It is important that those without adequate ID are not allowed entry into the work area. Those attempting to gain access without a correct ID must be reported to security at once. It is perfectly possible and reasonable for a technician to deny entry to a crew member with correct ID, if they believe they are going to act irresponsibly in the area. The main engineering room is protected by a blast door which can be closed by the chief engineer if they feel there is need.

The port and starboard solar panel controls and SMES units are located on their respective sides of the engineering airlock. There are external airlocks in these areas. Take caution.

In the centre of the main engineering room is the chief engineer's office. This contains the controls for the blast doors and the secure engineering storage. The contents of the secure engineering storage are currently classified. Engineer's lockers are to the aft of the room. Currently unused SMES units are also to the aft.

FIXED-PLACE EQUIPMENT AND COMPUTERS

AREA POWER CONTROL (APC)

APCs are located in every room or corridor on the station. These devices take current from the station grid, and then transmit this wirelessly to devices within their remit. Their range is hard-limited and cannot be changed. All items powered are categorized as Equipment, Lighting, or Environmental. Equipment power includes airlocks. The display lists these categories' power demand, as well as whether it is receiving external power and the amount of power that is left in the cell. If the APC is receiving inadequate power, the cell was start to drain. When set to "Auto" mode, the APC will automatically deactivate categories when the cell falls too long. An engineer's ID card will unlock the APC and enable the engineer to override the automatic control, or turn off the main breaker for the APC.

ATMOSPHERIC ALERTS

This is located in the control room in atmospherics. Data from every Local Air Monitor (LAM) on the station is collated here, with alerts being sorted into Minor and Priority. Both types of alert should be attended to by an atmospheric technician.

DISPOSAL UNIT

Vacuum tube system deposits discarded items in the disposal room, which is to the aft of toxins research and requires maintenance access to open. Take note these units pump air from their surroundings in order to function. They will not function with no atmosphere.

FIRE ALARM

Temperature-dependant fire alarm. Automatically closes fire doors in the event of heat rising above a specific point. This lockdown can be reset at the fire alarm, but will automatically re-activate if the temperature is still above the threshold. Can also be activated by hand, will remain activated until reset. In the event that a room is rising in heat but this is expected, it may be easier to deactivate the fire alarm. You are advised to inform security of your intentions before doing so. A wire at the back of the alarm can be cut with wirecutters to deactivate the alarm, the back light will turn off to show that it is inoperable.

LOCAL AIR MONITOR (LAM)

Local Air Monitors are located in every room or corridor on the station. They are essentially fixed versions of an atmospheric analyzer, which send their results to the atmospheric alerts computer in atmospherics. These monitors also contain the controls for the panic siphon and the local air override. (See Procedures)

MIXER CONTROLS

This are located in atmospherics and control the ratio of two mixtures being passed to the next stage of the distribution loop. For instance, the Oxygen/Nitrogen Mixer Control is located where the nitrogen pipe meets the oxygen pipe, and should generally be set at 20%///80%.

NAVIGATION BEACON

Controls the navigation of automatic robots such as securitrons.

SECURITY CAMERA

See: Artificial Intelligence

SOLAR CONTROL

See: Procedures

SUPERCONDUCTING MAGNETIC ENERGY STORAGE (SMES) UNIT

A device which stores energy in the magnetic field created by the flow of direct current in a superconducting coil which has been cryogenically cooled by FAAE-2 to below its superconducting critical temperature. These store the station's power and should be charging constantly so that they can be put into action in the event of an outage.

TANK MONITOR COMPUTERS

Located in atmospherics, displays the state of the various air tanks. These also control whether the input and output pumps for the tanks are activated.

TANK STORAGE UNIT

Stores a number of gas tanks in a efficient arrangement, with a “vending” device that can quickly provide them to a crew member. The two units in atmospherics contain oxygen tanks of the full size variety, whereas the unit in engineering also provides small tanks of FAAE-1.

PROCEDURES

ATMOSPHERICS

REPLACING LOST AIR

Situation: Pressure loss due to lost gas

Don internals. Evacuate the area of non-essentials. Assess the situation. If the pressure loss is small, it may be possible to allow the pressure to right itself. Check the LAM to judge this. If the loss is too large, or there is still a hull breach present, it may not be possible to replace the lost air.

Add air to the atmosphere by using an air canister from the atmospherics storage room, a PAP, or by switching to a local air override in order to quickly empty the local tank. Be sure to switch back to the main loop afterwards. Use space heaters to restore lost heat.

FIRE SUPPRESSION

Situation: Fire

Don fire suits and internals. Bring a CO2 canister to the scene. Evacuate the area of non-essentials. Ensure area is completely locked down. Assess the situation. If the fire is small, tackle it with fire extinguishers. If the fire cannot be tackled with fire extinguishers, try to commence Emergency Pumping. If the LAM is inaccessible, attempt to request pumping action from the AI (See Artificial Intelligence). If Emergency Pumping doesn't succeed on its own, find the area's local air canister. Replace the air canister with CO2 canister and activate local override. Continue to smother fire with CO2 until it is suppressed.

IMPORTANT: If the fire has plenty of fuel, do not attempt to start Emergency Pumping without first replacing the local canister with CO2 and switching to local override. Failure to do this will lead to more oxygen being fed into the fire from the distribution loop.

For station-wide catastrophe-level fires, the captain may request a station-wide CO2 flood. This can be achieved by opening the CO2 tank and setting the CO2 Mixer Control to 100%/0%. It is vital all crew members are aware of this action before it takes place.

When the fire is extinguished, replace the air canister and activate emergency pumping and scrubbing in order to clear the CO2 from the air.

EMERGENCY PUMPING

Situation: Contaminants in atmosphere

Evacuate and seal area. Ensure internals are worn. Advise all crew not to enter area, as this will allow more gases to enter the pumping area, negating the progress of the pumping. Unlock the LAM and activate "Two Minute Panic Siphon". This will begin pumping the air out of the room at a fast rate. It will be replaced with air from the distribution loop at a slower rate than it is being pumped out. It is important to consider whether the gas in the distribution loop is what is desired in the area.

If two minutes is not enough to clear contaminants, activate the panic siphon again. Remember to also use Air Scrubbers if possible.

ENGINEERING

SETTING UP THE SOLAR ARRAYS

Situation: Standard procedure throughout duty

Check the solar control computer and note the power being generated. If power is zero, check wires for connection and obtain EVA gear to check the array. If power is non-zero, set the SMES unit input to "Auto" and round the power generated down to the nearest 10,000. Set the Input to this level and the Output to this level, unless the power generated is above 100,000. If this is the case, case the input and output to 100,000.

The solar arrays must be constantly checked. If the “Input” value is above the power generated, the SMES will not charge at all. The combined “Output” values of the SMES must be above the power demand of the station. If an SMES runs out of charge, it will not output at all. As the station orbits the earth, the position of the sun will change and the power generated will change. This is why the array providing a lot of power is still only set at 100,000 and not, say, 150,000 – Because if it were set to 150,000, when the station moves and it falls to 149,999, the SMES wouldn't charge at all, despite the large amount of power being generated.

REPAIRING HULL BREACHES

Situation: A hull breach compromising station superstructure and atmosphere.

Don internals. Evacuate area. Assist with the safe movement of any injured away from the breach zone. Assess the situation:

SMALL, no more than a hallway wide breaches – If possible, build temporary walls to seal the breach area. Use metal to quickly rebuild the floor, beginning with a support lattice. Support lattice struts are designed to fit together easily even when portions have been removed. Request atmospherics bring a space heater to the area, but do not take time getting one personally. Every second wasted it more atmosphere lost. When a lattice has been built, fit and seal plating, allowing the FAAE-Com-impregnated metal to seal the vacuum. Do not begin repairing cables or pipes until vacuum is sealed.

MEDIUM, room-sized breaches - Build walls to seal the breach area. Request EVA equipment from EVA storage, use of the Rapid Construction Device (See Construction Handbook), and “Floorbots” from robotics. Do not attempt to seal the breach without EVA gear. Seal breach as you would a **SMALL** breach. If area is in a high-traffic area, treat as a **LARGE** breach.

LARGE breaches, more than the size of the cafeteria – Evacuate station populace to the nearest area with an atmosphere. Ensure entire station populace are wearing internals. Gain entry to EVA by any means necessary and obtain EVA gear for vulnerable or weakened crew members. **THE CHAPEL IS THE DESIGNATED EVACUATION POINT.** See Emergency Procedures. Attempt to call the emergency shuttle from Central Command as per the Emergency Procedures.

CONSTRUCTION

THIS SECTION HAS BEEN OMITTED FROM THIS VERSION OF THE HANDBOOK DUE TO ITS LENGTH. PLEASE CONSULT THE CONSTRUCTION HANDBOOK:

Construction Handbook Part no. E-(99)-6 (Handbook/Manual)

AIRLOCK REPAIR

Situation: A faulty or powered down airlock

Notify security that an airlock is being repaired. Security may otherwise mistake your repairs for improper entry. Assess the airlock.

Airlock Troubleshooting:

Does the airlock open to an ID that should have access?

If YES the airlock is functioning

If NO continue

Are any lights showing on the airlock at all, whether constantly or only when the ID is tried?

If YES continue

If NO go to solution 1) Powered down airlock

Are the lights on the airlock a solid red, or a blinking red when an ID is tried?

If SOLID red go to solution 2) Bolted airlock If BLINKING go to solution 3) IDScan Disabled

Solution 1 – The airlock is powered down. If time is not a necessity, it is better to see if power can be restored to the airlock rather than forcing entry. Check the local APC's "Equipment" setting. If this solves the power problem. If the APC's power appears to be adequate, the power wire in the door has been cut. Use a screwdriver to open the panel on the airlock to see the wires. Find any wires that have been cut and repair them, then close the panel again ensuring that all screws are re-fixed. If power cannot be restored due to an outage, a crowbar will force the airlock open, but it is better to see if the problem can be fixed.

Solution 2 – The airlock is bolted. You must raise the bolts of the airlock. Open the panel on the airlock with a screwdriver. Check to see if the "test light" is on. It is a small light at the top of the panel, labelled "test". If it is on, the power is on and you can continue with raising the bolts. If it is off, you must restore power before you can continue. To raise the bolts, you must use a multitool on the wire that controls the bolts, to send a change signal that will raise them. The wires used vary from station to station, the quickest way of finding the wire if you do not know what to use is to use a multitool on each until you hear a click from inside the door.. The red light will also deactivate."

Solution 3 – IDScan has been disabled on the airlock through sabotage. It may be necessary to break in to the airlock to open it. Enquire to the Artificial Intelligence as to why the door has its IDScan deactivated. See also Artificial Intelligence.

USE OF THE AUTOLATHE

An autolathe is a state of the art manufacturing device used to create items both simple and complex from basic materials. In order to load the autolathe with either metal or glass, place a sheet atop the machine. A collector cylinder will emerge and take the material, and deposit it into the autolathe. This may take a few seconds. The autolathe display shows all available items, some of the most commonly used being multitools and welding helmets.

When "ordering" items in the autolathe, the collector cylinder will emerge from the machine with your item within. It may be slightly warm to the touch, so please take care.

THE ARTIFICIAL INTELLIGENCE(AI)

The station is equipped with a state of the art artificial intelligence (AI), which has the ability to control all of the station electronics. It is bound by the Three Laws Of Robotics, but NanoTrasen have found that in certain situations is it necessary for the captain to use prudence and adjust the laws. For this reason, the capacity exists to alter the laws.

The AI is alive and can exercise creative thinking, and even humour. It is the pay-off of sentence that the AI cannot be everywhere at once and loses some of the efficiency of a pure machine. The AI is your servant, and is there to assist you in matters too mundane, dangerous, or tricky for humans to achieve.

Unfortunately, there have been known to be situations where an AI appears to not be following its laws. In these situations, you should endeavour to call upon the AI as little as possible, and may be called upon to disengage its cameras. A single wire cutter to the back of the camera, where the cord meets the wall, should do the trick.

Report all signs of the AI acting oddly. Security will know what to do..

EMERGENCY PROCEDURES

HULL BREACH

Engineering staff follow breach procedures. Atmospherics staff await orders. All others evacuate.

EXPLOSION

Assist with casualties. Extinguish fires. Evacuate areas. Assess hull breach.

INVASION VIOLENCE MUTINY DISSENT ASSAULT XENOS

Remain calm and await orders from security. Heads of staff report to the bridge.

In the event of the situation on the station degrading, you may consider petitioning for the CCES to be called.

THE EMERGENCY SHUTTLE

If the station situation is not viable the Central Command Emergency Shuttle (CCES) should be called. Bear in mind it takes roughly 10 minutes to prep the shuttle. Do not wait until it is too late. If you feel the shuttle should be called, tell your superiors.

Heads of staff and the AI can call the shuttle from a communications console. If no communications console is workable, one should be constructed using metal, glass, and the communications chip in either one of the other consoles, or Tech Storage.

If the heads of staff and the AI are incapacitated, crew members may take any means necessary to call the shuttle. This will include using another crew member's ID to do so. This offence will be overlooked in this situation.

In the event of the emergency shuttle being called, assist security officers in any way you can. Assist with the evacuation of all crew to THE CHAPEL, and make that area as secure and safe as you can while waiting for the shuttle.

YOUR ALLOCATED EVACUATION AREA IS:

THE CHAPEL, FAR STARBOARD

**NON-CIVILIAN CREW MUST ASSIST WITH CIVILIAN EVACUATION IF
THE ALARM IS RAISED**

REMAIN CALM

**A COPY OF THIS PAGE MUST BE DISPLAYED IN ALL
RECREATION AND WORK AREAS**

Part no. E-(99)-1-5 (Handbook/Manual) replaces:

Engineer's Handbook, v. 4 Part no. E-(99)-1-4 (*Obsolete*)

and

Atmospheric Technician's Handbook, v. 3 Part no. A-(99)-1-3 (*Obsolete*)

Parts prefixed with A-(99) (Atmospherics-(Handbooks/Manuals)) are now obsolete, with atmospherics being fully put under the control of the Chief Engineer. Obtain replacement documentation from Central Command at once or risk disciplinary action.

Other parts prefixed with A- (Atmospherics) remain so and will not be reclassified for ease of record keeping.

Ensure your engineering section has copies of the latest documentation:

Construction Handbook Part no. E-(99)-6

Disposal and Mail Routing Guide v. 2 Part no. E-(99)-5-2

Chief Engineer's Handbook, v. 8 Part no. E-(99)-2-8

Threats and Hazards, v. 5 Part no. G-(99)-4-4

General Crew Handbook, v. 9 Part no. G-(99)-1-9

Failure to have the latest documentation upon inspection will risk disciplinary action.

N A N O T R A S E N