# FEDERAL INTER STARBASE PATROL FORCE

**FISPF**

## PILOT'S INSTRUCTION MANUAL

# INTERDICTOR MK III

# FEDERAL INTER STARBASE PATROL FORCE



**FISPF**

## PILOT'S INSTRUCTION MANUAL

# INTERDICTOR MK III

# C O N T E N T S

# S E C T I O N   O N E

## CHAPTER 1

### ORDERS FOR THE CONDUCT OF OPERATIONS – INTERDICTOR PILOTS

Your prime task is to engage and destroy manned craft and drones of the Jahdra-Gallan Alliance. The following orders are laid down to assist you in the discharge of your duty.

#### 1. USE OF TRANSPONDER

Pilots may employ their transponder in the manner they see fit in the circumstances prevailing. Upon identification of a friendly craft, however, pilots are to set the unit to 'INT' and 'ON' if it is serviceable.

#### 2. RULES OF ENGAGEMENT

i)    Pilots are to use all means at their disposal to identify a contact and are not to engage until or unless they are sure that it is not a Federal craft.

ii)   All hostiles are to be engaged unless the pilot considers that the damage or ammunition states of his craft place him at too great a disadvantage for a reasonable chance of success.

iii)  Deflector shields are not to be used as an offensive weapon; pilots are not to deliberately ram any craft under engagement.

#### 3. CONDUCT IN STARBASE AIRSPACE

i)    Weapons systems are to remain 'OFF' during launch from and recovery to a starbase.

ii)   Pilots must observe maximum and minimum speed limitations in starbase airspace.

iii)  Transponders must be set to 'REC' during starbase recovery.

### ORDERS FOR THE CONDUCT OF OPERATIONS – FREIGHTER CAPTAINS

#### 1. CONTACT AVOIDANCE

Upon meeting a contact, you are to apply full thrust to attain maximum available velocity and steer directly away from the contact craft in order to escape beyond detection range.

#### 2. USE OF TRANSPONDER

Your transponder facility, which consists of a transmit-only serial identifier, is to be left continuously 'ON' unless the unit is unserviceable.

#### 3. RULES OF ENGAGEMENT

You are to engage a contact with all serviceable turrets that you can bring to bear if you experience hostile weapons fire or if the contact approaches within a range of 10KQ. If you have initiated engagement on grounds of encroachment and the contact subsequently retires beyond a range of 10KQ without returning your fire, you are to break off engagement.

#### 4. CONDUCT IN STARBASE AIRSPACE

i)    All laser-cannon ball-turrets are to be retracted during launch from and recovery to a starbase.

ii)   Captains must observe maximum and minimum speed limitations in starbase airspace.

iii)  Transponders must be set to 'REC F' during starbase recovery.

**NOTICE TO PILOTS**

Issuing Authority: Operations Command and Control Centre

Date: 05.12.37                    Ref: OCC/011/K

Subject: "Buzzing" of Friendly Craft

Many pilots have been reporting that after positive visual or transponder identification by a fellow Interdictor Mk 3, they have been repeatedly "buzzed" by the other craft. Pilots are reminded that the approved procedure, having identified another craft as friendly, is to switch the transponder to INTERDICTOR and ON and to fly away from the other craft.

Pilots are reminded also that "buzzing" a Federation freighter invites a hostile reaction from the freighter's ball-turret operators.

NOTICE TO PILOTS

Issuing Authority:   Inspectorate of Flight Safety

Date:  23.10.37                              Ref: IFS/290/F

Subject: Unauthorised Modification of Craft - INTERDICTOR MK 3

The practice of modifying craft by the fitting of a joystick to console
control port 2 is becoming more widespread.  It has been decided that the
practice should not be declared an offence.  However, the findings of the
Joint Engineering and Procurement Executive's Boards of Enquiry into the
matter are reproduced here and pilots are advised to take careful note of
the points raised.

Extract from the summary to B.Enq/100-23/1A dated 11.7.36

> .....and that the units (control consoles) supplied have not been
> built to design specification.  The number of primary input-
> output ports fitted for control/processor intercommunication has
> been reduced to 2, with the result that when the joystick unit is
> fitted and operated in conjunction with other controls, spurious
> control inputs are generated.  It is believed that prototype CA-
> 02 was lost through this cause during launch from a starbase.

> Due to the time scale involved it is not considered viable to
> have the units rebuilt, so it is recommended that Engineering Mod
> ST 172 B (details enclosed) be embodied.  This calls for the
> fitting of a damping circuit to one of the ports.

Extract from the summary to B.Enq/100-23/17D dated 15.10.36

> .....The embodiment of ST 172 B, while suppressing spurious
> control inputs, has the effect of further suppressing valid key
> inputs while joystick inputs are active......It is therefore
> recommended that the joystick be removed from the standard fit.

NOTICE TO PILOTS

Issuing Authority: Inspectorate of Flight Safety

Date: 30.11.37                        Ref: IFS/295/F

Subject: Collision Avoidance

It has come to the attention of IFS, through the Director of
Rectification and Repairs, that many Interdictor Mk 3 craft are returning
from sorties with very considerable collision damage - far too much to be
attributable to Meson Torpedoes alone.  It is therefore suspected that
some pilots are using their deflector shields as a weapons system and
ramming enemy craft.  Pilots are warned that this practice is not only
officially disapproved of but is also extremely hazardous.

## CHAPTER 2

### DIRECTOR'S ADDRESS TO NEW PILOTS

Welcome to the Federal Inter-Starbase Patrol Force. Read this manual
well - it and the simulator built into your craft are your sole tutors
since we do not have sufficient pilots to be able to afford the luxury of
providing instructors.

Remember, the simulator never killed anyone - though it does provide an
accurate imitation. There are too many dead sub-lieutenants on record -
killed on their first sortie, usually on recovery to starbase. There is
no good reason for this. It happens only to impatient young pilots who
do not complete a sufficiently long period of simulator training before
launching into the real thing.

If you absorb nothing else from this address then absorb this:

> become proficient in the simulator before you risk both
> your life and your craft on a combat sortie.

On 3rd April 2131 eleven battlestations of the Jahdra-Gallan Alliance
appeared in Federation airspace, thus violating the terms and conditions
of the Limhof Concord. Early diplomatic efforts on the part of the
Federation to avoid open confrontation were frustrated when the nine
members of our Representative Commission failed to return from their
fifth negotiational visit to the Alliance Mothership "KONTARKOHSZ".

Fifty Interdictor Mk 1 craft were despatched from the nearest Federation
starbase on a punitive mission against "KONTARKOHSZ" but none returned.
Communications received from the last few surviving Interdictors as they
tried to make good their escape indicated that the defences of the
formidable Jahdra-Gallan battlestations were impregnable to our craft.
They remain so to this day. The Federation therefore adopted a policy of
attacking Alliance freighters, patrol craft and drones in outer space - a
task to which the Interdictor Mk 1 was ideally suited. However, our
losses in the early stages of the conflict remained high, in part because
the excellent enemy patrol craft, the Jahdran Aggressor, was a more
sophisticated copy of our own Interdictor Mk 1 and also because our craft
would stray into Alliance battlestation airspace. Such unfortunates were
destroyed without exception.

Our performance in the conflict was dramatically improved with the
introduction in mid '33 of the Mk 2 variant of the Interdictor. In
addition to being faster and more powerful, it featured many new systems
including automatic avoidance of battlestation airspace at light-speed
cruise. The latest Mk 3 variant, introduced into service at the
beginning of '37 featured an improved cockpit layout and better weapons
systems. Our fleet now consists entirely of these craft. Consider
yourself lucky that you will never encounter an Alliance battlestation!

You will, however, encounter the Jahdran Aggressor, Gallanic Cruiser,
freighters and Meson Torpedo drones of the Jahdra-Gallan Alliance, as
well as fellow Interdictor Mk 3 craft, freighters and Meson Torpedo
drones of the Federation.

It is hoped that if we can sufficiently deplete their vast fleet of craft their battlestations will be forced to concede an untenable position and withdraw.

Be very sure that you positively identify a craft before engaging it and be particularly aware that an Interdictor is visually indistinguishable from a Jahdran Aggressor until at very close range. Too many otherwise capable pilots have been deported for acts against Federal shipping having failed to positively identify before engaging.

As an Interdictor pilot, your life will be made up of a series of sorties punctuated by 'shore leave' should you wish to take it. A sortie consists of four phases – launch from starbase, transit with encounters, recovery to destination starbase and administrative procedures there.

The most difficult phase of flight for a newly-commissioned pilot seems to be the recovery to starbase. It is not easy to get in without being shot down by the starbase automatic defence systems as a possible hostile craft. Learn and practice starbase recovery procedures in the simulator – like riding a hover-skate, when you have done it once it is easy to repeat.

There is some material in this manual that you do not strictly <u>need</u> to know but you are advised, for your own welfare, to digest it all before you leave the simulator behind you. Your knowledge will not be formally tested – other than by the craft and drones of the Jahdra-Gallan Alliance and the automatic defence systems of your own starbases!

If you are impatient to try your hand at the simulator then by all means proceed directly to Section Three, Chapter 3 – simulator operation. This will get you started, but for full training you will find the entire manual set out in a logical sequence.

GOOD LUCK !

Director
Federal Inter-Starbase Patrol Force

17 Nov 2137

## SECTION TWO

### CHAPTER ONE

### THEORY AND PRACTICE

As a newly commissioned Interdictor Pilot it is important for you to have at least a basic working knowledge of what makes your craft "tick". This short section is intended to give you a grounding in how things work. For further information consult 'Field Theory and Electromagnetic Dynamics' by Klee Ebon D.G.S., and 'Advances in Crystal Technology' by Dr Robert Abercrombie F.D.C.R.

#### DEFLECTORS

In the latter part of the last century a research team at the Phethean Institute of Science and Technology discovered that when projected to form a uniform, coherent field, three beams of particle energy (K-meson, unstable plutonium nuclides and nutrino) formed an interference boundary impenetrable to both solid projectiles and to electromagnetic forces. This interference boundary, known as the KPN phenomenon, makes possible your propulsion and defence systems.

When the vanes of your deflector wave form guides detect an incoming laser weapons threat, deflector power is instantly diverted from the propulsion unit to form a protective shield around your ship. Due to the detection time lag and the finite time that the deflector shield takes to reach full protective power, an incoming laser threat from an Alliance ship will partially penetrate the shield if fired from a range closer than 140kO. At closer ranges still, progressively more of the incoming laser energy will get through the incomplete deflector shield until at point blank range the deflectors are too slow to do any good at all.

Deflectors are also erected against incoming photon bolt threats, but each time a photon bolt impinges on your deflector shield a portion of your deflector power is lost. Without deflectors a single direct hit photon bolt to your ship would be fatal.

The deflector shield is also erected against collision. When this occurs a proportion of your deflector capacity is lost, the amount being dependent upon the deflector strength of the other ship at the time of collision. Further, the deflector/deflector interaction causes a schism in the continuation of space/ time. The two contact ships both maintain their alignment in space – assuming that neither was destroyed in the collision – but they inherit an instantaneous spacial separation of random nature.

In addition, some portions of your ship are deemed so important as to warrant continuous, dedicated deflector protection. Such portions of your ship are invulnerable to battle damage as protection is supplied by an auxiliary deflector generator. Deflector power is dropped for starbase approach.

## PROPULSION

Fuelled by an atomic core of 90kg capacity propulsion is by means of pulsed thermonuclear explosions within the drive unit. Deflector power shields your ship from the drive unit whilst also providing the means for both forward and retro-thrust, governed by the placement of the end deflector barrier as illustrated below:
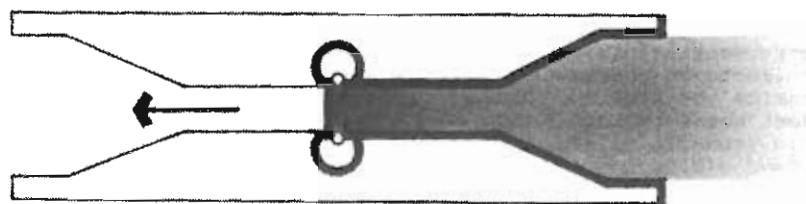
**FORE**                    **AFT**
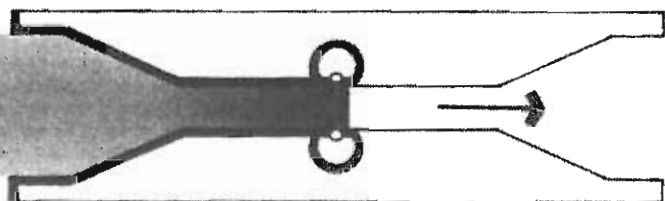
The motor unit responds to the pilot's accelerator/decelerator selections with forward/retro-thrust to a maximum velocity of $100\Omega$/sec in an undamaged ship and a minimum of zero. If your ship has sustained any damage then the maximum attainable speed will be somewhat less than $100\Omega$/sec. If having reached the maximum or minimum speed you continue to apply motor power then atomic fuel is still jettisoned though it is not detonated. When you have attained your desired velocity and cut the motor you will continue to cruise at that velocity in accordance with Newton's Laws. If deflector power were completely exhausted through battle damage the motor unit would run critical and your ship would explode!

## DIRECTIONAL CONTROL SYSTEM

Directional control is by means of a large, centrally mounted inertial gyroscope. Your horizontal/vertical steer selections are applied to the gyroscope as torques displaced through ninety degrees from the required craft attitude change. Secondary precession causes the craft to alter its direction in accordance with your steering inputs.

## STABILISERS

An unfortunate side effect of deflectors is the creation of artificial turbulence -- even in the vacuum of space! Your ship is therefore fitted with a gyro-stabilised platform which detects non-stable moments of inertia and applies corrections via a servo loop through the directional control system. Deflector turbulence does not affect your ship when it is at rest.

If your stabilisers have failed, you will get a very uncomfortable ride if in free space with any forward velocity. When flying an approach to starbase, however, no turbulence will be experienced since your deflector power is automatically dropped during this phase of flight.

## SATURN ARRAY

The Saturn Array is a pod containing various sensors and transmitters. It contains the following:-

        Auto-tracking pulsed laser transmitter
        Target acquisition tracking radar transmitter
        Target acquisition tracking radar receiver
        Polarised deflector field sensor head
        Pulsed doppler radar transceiver
        Standby transponder transmitter

All of the above devices (with the exception of the standby transponder transmitter) have very short activation cycles - typically less than 2.5ns - and trigger no more than 20 times per second. This, in real terms, means that during a one hour flight the devices within the pod would be actually transmitting or receiving for no more than $1.8 \times 10^{-4}$ seconds, less than 0.2 milliseconds! It is therefore possible to provide virtually uninterrupted dedicated deflector power protection to this very important pod. Instrumentation and devices that these sensors feed are therefore not individually susceptible to damage.

The standby transponder transmitter, whose transmissions are of a continuous nature, cannot transmit from the pod in normal flight. Its' sole function, however, is to identify your craft on recovery to starbase - a phase of flight during which deflector power is dropped - so it was included in the pod for the essential invulnerability that it offered.

## LEWIS ARRAY

The Lewis Array is a pod containing various sensors and transmitters. It contains the following:-

        Auto-tracking pulsed laser receiver
        Transponder main transmitter
        Transponder receiver
        Angular velocity tracking head

Due to the continuous nature of operation of these devices it is not possible to provide them with continuous, dedicated deflector protection

— they would simply cease to function. You will therefore find that instrumentation relying on information from these devices is vulnerable to battle damage. The pod is retracted during light speed drive to prevent damage due to particle impact.

## LIGHT SPEED DRIVE

From Einstein to Zebenezer Roth it was beleived that travel at speeds approaching or in excess of the speed of light was not possible. The proof was derived from Einstein's equation:

$$E = mc^2$$

or the energy contained in a body is equal to its mass multiplied by the square of the speed of light. Since it was possible to prove that at speeds tending towards that of light energy would approach infinity, it followed that mass too must approach infinity, since the speed of light — though very considerable — is nonetheless finite. Since mass can be defined as a body's resistance to further acceleration, it naturally follows that as a body approaches the speed of light its resistance to further acceleration becomes infinite — it can be accelerated no further....until the advent of deflector technology.

Since no energy can cross the boundary of a deflector shield, if the shield envelops your ship at the moment of application of a massive impulse, the total energy of your ship does not increase as it accelerates. If the total energy remains constant so too must the mass — light speed is no longer a barrier.

Let us now consider the mechanics. Your ship carries a magazine of Phohn bombs — a powerful weapon of the last century about the size of a clenched fist functioning on the principle of matter/anti-matter interaction. Upon selection of STEER mode your ship will adjust its speed to 50Q/sec and align itself with your destination starbase. It will eject a Phohn bomb rearwards erecting the deflector shield around your ship prior to the detonation. The forward speed of 50Q/sec is important to ensure that the Phohn Bomb detonates hard against the deflector shield for maximum impulse. At any lower speed the impulse will occur inside the deflector shield causing a catastrophic deflector K-meson depletion — when you drop back to convential cruise you will find your deflectors at about 2% capacity with random damage inflicted upon your susceptible components.

IT IS THEREFORE ESSENTIAL THAT YOU ALWAYS HAVE SUFFICIENT ATOMIC CORE TO ATTAIN A CONVENTIONAL VELOCITY OF 50Q/SEC BEFORE ENTRY TO LIGHT SPEED DRIVE AND THAT YOU DO NOT OPERATE THE DECELERATOR PRIOR TO DRIVE.

The process is reversed to drop you from light speed to a conventional speed of 50Q/sec. This occurs when manually selected, upon meeting a contact, or on arrival at destination starbase.

## WEAPONS SYSTEMS

It is assumed that the newly commissioned Interdictor Pilot will already possess a working knowledge of laser weaponry. All that we wish to point out with regard to your laser weapons system is that the Federation have opted for a rapid-fire system. This reduces the range of your lasers against those of the Alliance due to the inherently slower beam rise-time of a more rapidly firing device — your target has more time between threat detection and beam arrival in which to erect his deflectors (see DEFLECTORS above).

Your Photon Bolts system fires a salvo of two bolts of photon energy and has a fire rate of approximately thirty salvoes per minute. A photon is a 'bundle' of electromagnetic energy whose energy is inversely proportional to its wavelength. Typically, X-rays for example, have a wavelength of $10^{-9}$cm, but we have recently produced a photon generator capable of producing wavelengths in the order of $10^{-12}$cm. At these frequencies the generator is able to 'package' a bolt of photon energy within the photon bolt nozzle before ejecting it. The bolt accelerates as it moves clear of the nozzle and continues to do so until it burns itself out. The bolt will not inherit angular velocities from your craft at the time of firing, it will instead travel along its initial line of sighting.

# S E C T I O N   T H R E E

## CHAPTER 1

### COCKPIT DISPLAY AND INSTRUMENTATION
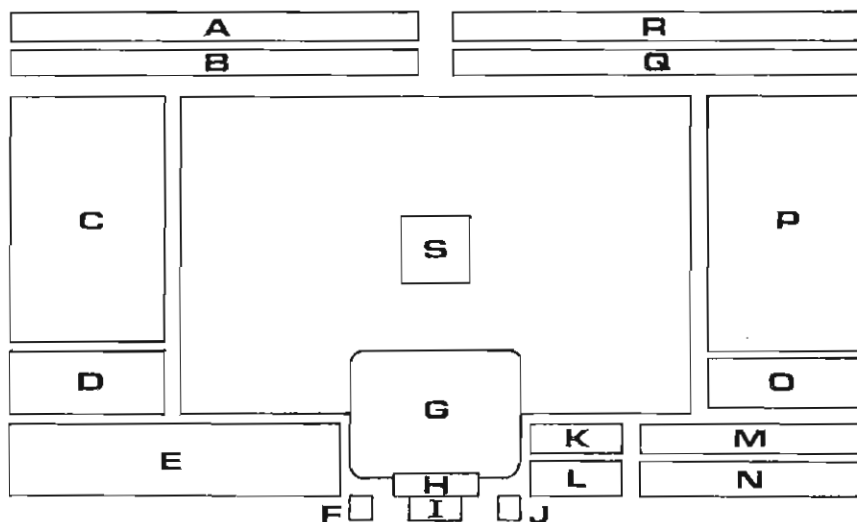


| A | Target Deflector Strength Indicator | J | Collision Warning Light |
|---|---|---|---|
| B | Range Indicator | K | Auto Laser Fire Selection Indicator |
| C | Damage Status Indicator | L | Target Acquisition Fine Mode Indicator |
| D | Target Axial Advice Indicators | M | Laser Energy System Weapons Indicators |
| E | 3-Way Velocity Indicator | N | Photon Bolt System Weapons Indicators |
| F | Photon Bolt Warning Light | O | Simulator System Status Indicator |
| G | Target Acquisition System Display | P | Transponder |
| H | Doppler Velocity Display | Q | Atomic Core Fuel Indication System |
| I | Recovery Computer Hazard Warning System Lights | R | Threat Evaluation System Display |
| | | S | Sight |

The instrument display has been ergonomically designed - with a little practice you will find yourself absorbing all of the information you require from it with minimal effort or distraction. Indeed, due to the extensive use of flashing light and horizontal bar-graph instrumentation, you should find that with practice you are able to read everything without being distracted from the all-important events occurring outside the craft.

## A:  TARGET DEFLECTOR STRENGTH INDICATOR



Input Sources: polarised deflector field sensor head, laser ranging system.

Working Principles: the polarised deflector field sensor head is constantly monitoring the incoming strength of any external deflector field within detection range. This reading is then factorised to take target range into account via a Kalin amplifier linked into the laser ranger circuitry and the resultant absolute deflector strength is displayed.

Damage Susceptibility: due to the damage susceptibility of the laser ranger system if the ranger is lost through battle damage then the target deflector strength indicator will be lost also.

Interpretation: the display type is horizontal bar-graph. The greater the deflection to the right the greater is the deflector strength of the target ship, with full-scale deflection representing a deflector strength equal to that of an undamaged Interdictor Mk 3. If the box at the extreme right is flashing an inverse red 'F' then the system has failed due to loss of the ranging system.

The example above indicates a target with a deflector strength of approximately 60% of that of an undamaged Interdictor Mk 3.

## B:  RANGE INDICATOR



### YELLOW RED GREEN

Input Sources: auto-tracking pulsed-laser receiver, on-board computer.

Working Principles: the auto-tracking pulsed laser transmitter fires a 1.2ns duration laser beam at any contact in range at a rate of 16 times per second. The receiver, which is constantly monitoring for return signals, passes received signal strength to the on-board computer which then extracts target range for display.

Damage Susceptibility: due to the mounting of the receiver in the Lewis Array, the laser ranger system is damage susceptible.

Interpretation: the display type is 3-segment, multicolour horizontal bar-graph. The greater the deflection to the right, the greater is the range of the target ship, with full-scale deflection representing a range of 220KQ. Within the green sector of the display (140-220KQ) both yourself and the target ship are outside laser weapons range of each other. Within the red sector (100-139KQ) the target ship is outside your laser weapons range, though you will be within his laser weapons range if

he is an Alliance ship or a freighter.  Within the yellow sector (0-99KQ)
any  target  ship  is  within  range  of  your  laser  weapons.  Visual
acquisition  range is 150KQ.  If the box at the extreme right is flashing
an  inverse red 'F' then the system has failed due to battle damage.  The
ranger  also gives indications of distance to go at light speed cruise to
destination  starbase  on  a scale of 0-55MQ, and of distance  to  go  on
launch/recovery on a scale of 0-220KQ.

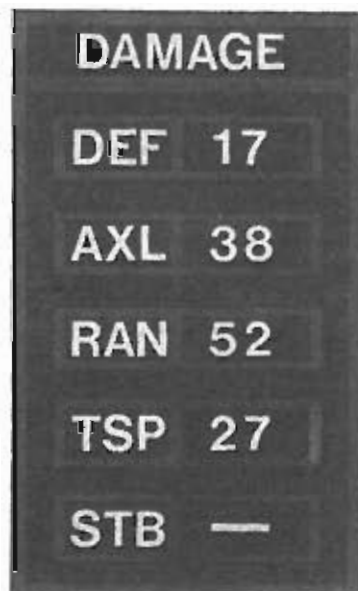The example above indicates a target at range 220KQ.

## C:  DAMAGE STATUS INDICATOR

Input Sources:  argon/tungsten Schultz
monitor  probes  located  within  the
Lewis  Array,  deflector  regulator
computer,  stabiliser-mounted  torque
sensor.

Working Principles: direct output from
the above devices to the display.

Damage Susceptibility: nil.

Interpretation:  in  the case of  the
deflectors  (DEF)  indication,  the
display  shows  the  percentage  of
deflector  power  lost through battle
damage.  All  other  indicators  show
estimated  failure  projection,  on  a
nominal  percentage  basis.  These
indicators  become  progressively  more
accurate  as  a  system  approaches
failure  point.  Upon failure, a  fail
bar  will cover the numeric window for
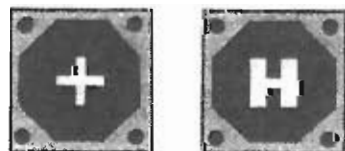the system concerned.

The readings in the example above indicate:

        DEF 17 - deflectors 17% lost (83% remaining)
        AXL 38 - axial advice indicator 38% towards failure
        RAN 52 - laser ranger 52% towards failure
        TSP 27 - transponder 27% towards failure
        STB -- - stabilisers failed

## D:  TARGET AXIAL ADVICE INDICATORS

*** 4 ***

Input Sources:  auto-tracking angular velocity head, pulsed doppler radar
transceiver, target acquisition tracking radar, on-board computer.

Working Principles:  using data from the above inputs, it is possible to
compute the target's motional vector relative to your own geometric axes.
Given  his  motional  vector relative to you, it is a simple  process  to
transpose  the  information  to yield your own position relative  to  his
geometric  axes.  This  the  on-board  computer  does  and  feeds  the
information to the display.

Damage Susceptibility:  due to the mounting of the auto-tracking angular
velocity head in the Lewis Array, this system is damage susceptible.

Interpretation:   the  instrument will tell you at a glance how a  target
'sees'  you - whether you are behind or in front of him, whether you  are
displaced  vertically or horizontally from his sighting line or not.   It
will help you to manoeuvre for attack, indicate when he is doing so, give
a fair indication of when you are in his sights and let you know if he is
running  away.  The leftmost of the two indicators is the head-on/tail-on
indicator.  If you are situated somewhere within his frontal  hemisphere
(head-on)  the display will show a dot.  If you are somewhere within  his
dorsal  hemisphere  (tail-on)  the  display will show a cross.  If  the
display  is  alternating  dot/cross then you are somewhere in  his  abeam
position.  The rightmost of the two indicators shows your horizontal and
vertical  displacements from his sighting line.  The symbology used is as
illustrated below:

A    you are close to his sighting line
B    you are somewhat displaced horizontally
     from his sighting line
C    you  are  considerably  displaced
     horizontally from his sighting line
D    you  are displaced vertically from his
     sighting line

A    B    C    D

Notice  how  the symbology follows the convention of a  three-dimensional
letter  "H"  being rotated in accordance with the target craft's  relative
axis.

Note that the example above illustrates a target to whom you are somewhat
displaced horizontally from his aft sighting axis.

## E:  3-WAY VELOCITY INDICATOR

Input  Sources:  deflector  regulator computer, drive  motor  monitoring
probes,  pulsed  doppler radar transceiver, axial advice indicator,  on-
board computer.

**Working Principles:** direct output from the drive motor monitoring probes feeds the V1 indication (velocity of your ship). Output from the deflector regulator computer via the on-board computer feeds the VM indication (maximum velocity of which your ship is capable). Using the other input sources, it is possible to compute the target's absolute velocity from his relative velocity and direction of motional vector. This is fed to the V2 indicator.

**Damage Susceptibility:** due to the reliance on information from the axial advice indicator (a damage susceptible device) the V2 indication will be lost if the axial advice indicator fails. The other two velocity indicators are not damage susceptible.

**Interpretation:** the display type is 3-way horizontal bar-graph. The greater the deflection to the right the greater is the velocity indicated, on a scale of 0 - 100.

The example above indicates:

        V1  -  your velocity 45Q/sec
        VM  -  your maximum attainable velocity 65Q/sec
        V2  -  target ship's velocity 14Q/sec

If the axial advice indicator has failed, then the V2 window will remain empty, irrespective of target velocity.

**F:  PHOTON BOLT WARNING LIGHT**

**Input Sources:** polarised deflector field sensor head.

**Working Principles:** when a photon bolt is inbound towards your ship it places an absorption 'notch' in the detected spectrum of the target ship's deflector field. When this anomaly is detected a signal is fed to your console to flash the warning light.

**Damage Susceptibility:** nil.

**Interpretation:** self evident - display type flashing light.

**G:  TARGET ACQUISITION SYSTEM DISPLAY**

**Input Sources:** target acquisition tracking radar receiver, on-board computer.

**Working Principles:** output from the target acquisition tracking radar receiver is processed by the on-board computer and fed to the display.

**Damage Susceptibility:** nil.
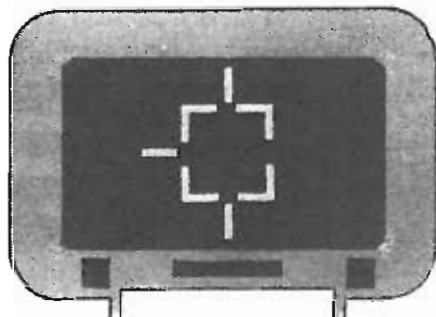
**Interpretation:** display type is VDU. If a target is present, one of the eight white display segments will be flashing on and off. The flashing segment indicates the steer required to centre the target. If the target is centred the four elbow segments will be flashing. The three lights across the base of the VDU are part of the recovery computer hazard warning system and are covered in that section.

The example above indicates that a right steer is required to centre the target.

**H:  DOPPLER VELOCITY DISPLAY**

**Input Sources:** pulsed doppler radar transceiver.

**Working Principles:** the pulsed doppler radar transceiver fires a 0.5ns duration burst of fixed-frequency radar energy at the target at a rate of 20 times per second. The returned signal is analysed for Doppler shift - a shift in the radar frequency caused by relative motion between the two craft. The result is factorised to represent relative velocity between the two craft and fed to the display.

**Damage Susceptibility:** nil

**Interpretation:** the display type is numeric crystal. Doppler velocity - otherwise known as relative velocity - is a measure of the rate at which the distance between yourself and the target is decreasing (positive relative velocity) or increasing (negative relative velocity).

The example above indicates a positive relative velocity of 24Q/sec.

**I:  RECOVERY COMPUTER HAZARD WARNING SYSTEM LIGHTS**
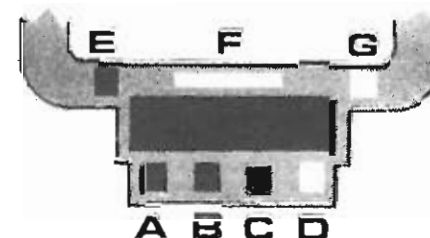
**Input Sources:** recovery computer.

**Working Principles:** during launch from and recovery to a starbase, the recovery computer is continuously monitoring your velocity, position,

transponder  and weapons system.  If any of the monitored parameters  are
incorrect  or dangerous, a warning light is illuminated.  The system  has
no function outside of starbase airspace.

Damage Susceptibility:  nil

Interpretation:   the bottom row of four lights each refer to a  specific
recovery parameter.  They are:-

               A  -  speed
               B  -  launch/recovery path displacement
               C  -  transponder
               D  -  weapons

If light 'A' is illuminated your speed is within 5Q/sec of the maximum or
minimum permitted speed.  It is a warning not to accelerate or decelerate
further.  When 'B' is lit your displacement from the launch/recovery path
is  too  great.  It is a warning that you should steer back  towards  the
path.   If  light 'C' is on, your transponder has not been set  to  'REC'
during  recovery; do so immediately.  Finally, if 'D' is illuminated  one
of your weapons systems is on and should be switched off immediately.

The  top row of three lights act as a monitor to starbase  auto-defensive
systems  -  they  will  destroy  you if  you  fail  to  follow  approved
launch/recovery  procedures.  If, due to your being  outside  approved
parameters,  starbase auto-defensive systems 'lock on' to your craft with
their  tracking radars, warning light 'F' will light up.  You only have a
set  distance-time quotient of 'lock on' available to you before you  are
shot  down.  Lights 'E' and 'G' act as  accumulators  monitoring  and
accumulating  the distance-time quotient while light 'F' is  illuminated.
Indications are:

          E only : more than 25% distance-time quotient used
          G only : over 50% distance-time quotient used
          E & G  : greater than 75% distance-time quotient used

The  example indicates that your weapons are switched on causing a  'lock
on'  by starbase auto-defensive systems.  You have used more than 50%  of
your  permitted 'lock on' distance-time quotient.  (If you were to select
weapons off, lights 'D' and 'F' would be extinguished but light 'G' would
remain on.)

J:  COLLISION WARNING LIGHT

Input Sources:  on-board computer.

Working Principles:  The  on-board computer  is  constantly  monitoring
target  range against Doppler velocity.  Whenever the range decreases  to
less than ten times the Doppler velocity (positive), the warning light is
activated.

Damage Susceptibility:  nil

Interpretation:  self-evident, display type flashing light.

K:  AUTO LASER FIRE SELECTION INDICATOR

Input Sources:  target acquisition computer auto gate.

Working Principles:  direct output from the above source to the display.

Damage Susceptibility:  nil.

Interpretation:  self-evident, display type flashing light.


L:  TARGET ACQUISITION FINE MODE INDICATOR

Input Sources:  target acquisition computer resolution gate.

Working Principles:  direct output from the above source to the display.

Damage Susceptibility:  nil.

Interpretation:  self-evident, display type flashing light.


M:  LASER ENERGY SYSTEM WEAPONS INDICATORS
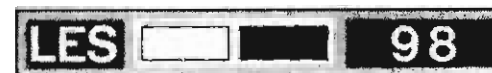


Input Sources:  laser weapons bay monitoring probes.

Working Principles:  direct output from the above source to the display.

Damage Susceptibility:  nil.

Interpretation:   the instrument consists of two indicator systems -  one
double  flashing  light and one numeric display.  The light at  the  left
indicates  that the laser weapons system has been selected on.  The light
at  the right indicates that the system has attained on-line status.  The
numeric  display indicates the remaining system fire capacity, at a  rate
of ten laser shots per unit capacity remaining.

The  example  above indicates that the laser energy system  weapons  have
been  selected  on,  but are not yet on-line and ready to  fire,  with  a
system capacity of 98 remaining.


N:  PHOTON BOLT SYSTEM WEAPONS INDICATORS



Input Sources:  photon bolt weapons bay monitoring probes.

Working Principles:  direct outputs from the above source to the display.

**Damage Susceptibility:** nil.

**Interpretation:** the instrument consists of two indicatr systems – one double flashing light and one numeric display. The light at the left indicates that the photon bolt weapons system has been selected on, the one on the right shows that the system has attained on-line status. The numeric display gives remaining system fire capacity, at a rate of one salvo per unit capacity remaining. The example above indicates that the photon bolt system weapons have been selected on and that they are on-line and ready to fire, with a system capacity of 5 salvoes remaining.

## O: SIMULATOR SYSTEM STATUS INDICATOR

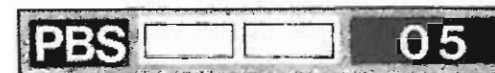**Input Sources:** simulator computer trip relays.

**Working Principles:** direct output from the above sources to display.

**Damage Susceptibility:** nil.

**Interpretation:** if either of the two alphabetic lights at the right is flashing then the simulator is selected on. If the flashing light is the 'H' then the simulator is running in real-time i.e. high speed. If the flashing light is the 'L' then the simulator is running in slow motion i.e. low speed. The example above indicates that the simulator is switched off.

## P: TRANSPONDER
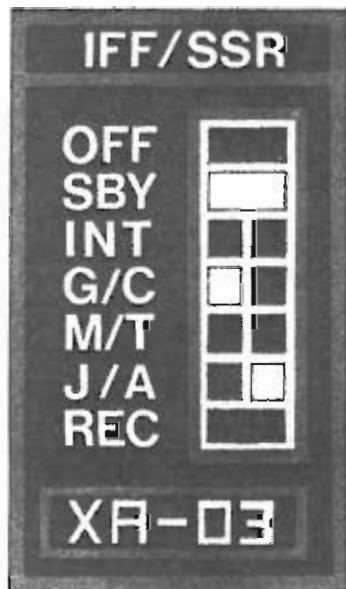
**Input Sources:** transponder receiver, transponder input selector chip.

**Working Principles:** the transponder, otherwise known as 'Identification of Friend or Foe/Secondary Surveillance Radar' (IFF/SSR), has been around since the mid 20th century. When switched on or to standby it transmits a coded radar beam which, if it encounters another ship with a transponder which is switched on, causes that ship's transponder to trigger and transmit a coded reply to your 'interrogation'. Similarly your own transponder will reply to interrogation by a third party if it is switched on. The coded replies transmitted can consist simply of an identification of ship type or the ship's actual serial number or both of these. If your transponder is switched to standby you will interrogate other ships and their responses, if any, will be displayed to you. However, your transponder will not respond to any interrogation it receives.

When switched on the transponder fitted to the Interdictor Mk 3 will automatically respond to interrogation with the craft serial number along with the ship type identifier code if 'INT' has been selected. Note however that Meson Torpedoes, Gallanic Cruisers and Jahdran Aggressors are fitted with transponders that can transmit or suppress the ship type identifier code and the ship serial number individually, while the Freighters are fitted with a serial number only typetransponder. If you have elected to set your transponder to anything other than 'INT' for ship type then you will transmit only the ship type identifier associated with that ship.

Remember – if your transponder is set to standby you have tha advantage of being able to decode incoming beams while not betraying any details concerning your own ship.

**Damage Susceptibility:** due to the mounting of the transponder main transmitter and receiver in the Lewis Array the system is damage susceptible. However, should the transponder fail due to battle damage there is a back-up system in the standby transponder transmitter. This is for the sole purpose of enabling you to transmit the RECovery signal while flying an approach to starbase since failure to do so has fatal results. This system is not available outside starbase airspace.

**Interpretation:** the display type is flashing light with alphanumeric window. The column of three character identifiers to the left of the instrument decode as follows:-

| | | |
|---|---|---|
| OFF | – | off |
| SBY | – | standby |
| INT | – | Interdictor |
| G/C | – | Gallanic Cruiser |
| M/T | – | Meson Torpedo |
| J/A | – | Jahdran Aggressor |
| REC | – | recovery mode |

Where the flashing light panel is divided into two columns the lights to the left indicate the ship type to which you have set your transponder while those to the right indicate any incoming ship-type signal. The alphanumeric window at the bottom displays the decode of any incoming ship's serial number transmission. Federation craft serial numbers all have the leading character 'C' while Alliance craft serial numbers all have the leading character 'X'.

The example above indicates that you have set your transponder to Gallanic Cruiser but you are not transmitting this because the transponder is set to standby mode. There is an incoming signal of Jahdran Aggressor and the target is also transmitting his craft serial number XA-03.

## Q: ATOMIC CORE FUEL INDICATION SYSTEM

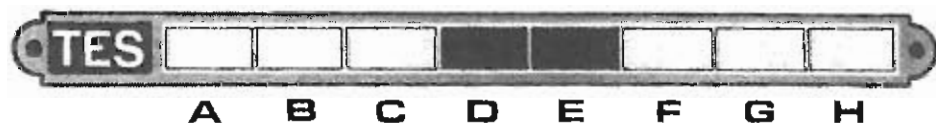**Input Sources:** atomic core monitoring probes.

**Working Principles:** direct output from above source to the display.

**Damage Susceptibility:** nil.

**Interpretation:** display type is horizontal bar graph with flashing light scale indicators. The greater the deflection to the right the greater is the atomic core fuel remaining. If the 'H' light is flashing the instrument is on the High scale and indicates atomic core fuel remaining in the range 9kg to 90kg. When the 'L' light flashes the instrument is on the Low scale and indicates atomic core fuel remaining in the range 0kg to 9kg.

The example above indicates 45kg of atomic core fuel remaining.

## R: THREAT EVALUATION SYSTEM DISPLAY



**Input Sources:** target acquisition tracking radar receiver, axial advice indicator, transponder, laser ranger, V2 indicator, deflector regulator computer.

**Working Principles:** direct output from the above sources to the display.

**Damage Susceptibility:** lights C, D, E and F are susceptible to damage

**Interpretation:** display type is horizontally banked flashing lights. Each of the segments has its own specific meaning relating to a specific threat factor. Most newly commissioned Interdictor pilots, not caring to learn the meaning of each indicator light, merely take the attitude that the more lights that are flashing the greater the threat. This is loosely true but for the more professional pilot here is what they each mean:

        A — no threat
        B — there is a target within detection range
        C — the target has a velocity in excess of 63Q/sec
        D — the target is facing you
        E — a potentially hostile transponder transmission
            has been received
        F — the target is within Alliance laser weapons range
        G — the target has fired at you
        H — the target has fired at you recently

Note that the lights are arranged in order of increasing threat factor. The example above illustrates that there is a target present, he has a velocity in excess of 63Q/sec, he is within Alliance laser weapons range and he has fired at you recently.

**S: SIGHT**

**Input Sources:** target acquisition computer, on-board computer.

**Working Principles:** output from the above sources to the head-up display generator.

**Damage Susceptibility:** nil.

**Interpretation:** there are three different sight graticules that can be projected onto your view screen. They are as illustrated below:
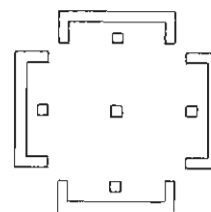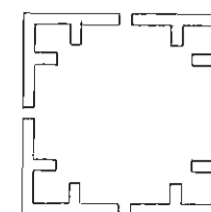


Targetting on,          Targetting on,          Targetting off
target in front         target behind you       steer mode selected
(or no target
present)

CHAPTER 2

CONTROLS AND OPERATION

When you first step into your Interdictor Mk 3 it will be at rest in a starbase launch bay, aligned with the approved departure path for that bay.

POWER ON

Control:  *

Operation:  on selection of POWER ON the craft's systems are brought · on-line.  Only cockpit lighting will function prior to main power application.

COCKPIT LIGHTING

Controls:  INST/DEL  CLR/HOME

Operation:  to turn cockpit lighting on use the INST/DEL key.  To turn off use the CLR/HOME key.

LAUNCH MASTER SWITCH/ CONVENTIONAL SPEED CONTROLS

Controls:  RIGHT SHIFT KEY   LEFT SHIFT KEY

Operation:  on depressing the launch master switch while inside the launch bay with main power applied, the launch bay doors are opened and the launch platform impulse accelerates your craft to a speed of 100/sec – the minimum permissible departure speed.  Since it is also the convential speed accelerator if you keep the key depressed you will continue to accelerate.  ACCELERATE NO FURTHER THAN 750/SEC – this is the maximum permissible departure speed.  You will see a tunnel on the screen down which you are flying.  This tunnel is merely a computer-generated three-dimensional representation of the approved departure path based upon information from three beacons inside the launch bay.  No steering adjustments are necessary on launch, though if you do wish to make steering adjustments do not stray too far outside the tunnel!  Keep your weapons systems OFF!
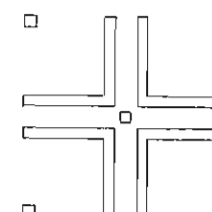
Use the LEFT SHIFT key to decelerate.

MANOEUVRE CONTROLS

Controls:  CRSR KEYS  RUN/STOP  CBM  (or joystick if fitted)

Operation:  joystick operation is self-explanatory.  Be aware that it does not offer as fine a degree of control as do the manoeuvre keys and you will find that very fine control is of the utmost importance in a successful starbase recovery.  The keys function as follows:-

CRSR UP/DOWN        – steer left
CRSR LEFT/RIGHT     – steer right
CBM                 – steer down
RUN/STOP            – steer up

You will find with practice that by keeping four fingers over these keys and a thumb over the firing bar that you are able to control the craft effortlessly.

Manoeuvre controls are not available in 'STEER' mode.  Note also that when a joystick is fitted, all keyboard inputs are disabled whilst the joystick is active.

STEER MODE

Controls:  S  Z

Operation:  STEER mode can only be selected in free space with NO TARGET PRESENT.  Pressing S causes your ship to adjust its conventional speed to 500/sec, realign itself with your destination starbase and, after a short delay during which your navigation platforms and light speed drive computer fine-adjust themselves, you will punch into light speed.  There you will remain until you encounter a target, reach destination starbase or cancel steer mode by pressing Z.

WEAPONS SYSTEMS

Controls:  CTRL  RETURN  L  P  A  <  FIRING BAR

Operation:  the CTRL key is the weapons system master switch.  It switches the weapons system ON delivering the Photon Bolt weapons system as the default entry point.  To bring the Laser Energy weapons system on-line select L after CTRL.  To return to Photon Bolt system select P.  The weapons system is switched OFF with the RETURN key.  There is a delay of approximately 18 seconds between selecting a system ON and it reaching on-line, ready-to-fire status.

The Laser Energy system features an auto-fire facility selected by the A key when the Laser System is selected.  This facility will automatically fire your lasers whenever any portion of an in-range target is centred in your sights provided that the system is ready to fire (in auto mode the fire rate is very much slower than in manual).  The target acquisition system must be switched ON before auto can be selected.  To cancel auto mode use the < key which also switches the target acquisition system OFF.

To fire either weapons system manually use the firing bar.  Hold this down for continuous fire.  Note that your weapons system is disengaged by any of the following:

                    target destruction
                    collision
                    selection of STEER mode

Weapons range:  the Photon Bolt weapons system is operable up to the limit of visual acquisition range (150K0) but the Laser Energy weapons

system is effective only at ranges of up to 99KQ (the yellow sector of your laser ranger display). Note that Alliance laser weaponry has a greater range than your own - up to 140KQ (the limit of the red sector of your laser ranger display). This is due to their faster laser beam rise-time, though this gives them the disadvantage of a slower fire rate (see Section Two "Theory and Practice - deflectors and weapons systems"). Both Laser and Photon Bolt weapons have greater effect with decreasing range.

Note: the target acquisition system resets when Photon Bolts are fired.

## TARGET ACQUISITION SYSTEM

Controls:   >   <   F

Operation:  the system is selected ON by the > key and OFF by the < key. Select FINE mode of operation with the F key - in this mode the target must be precisely centred in your sights in order to give target centred indications, whereas in normal mode of operation you will be given target centred indications if the target is anywhere within the geometric boundaries of the targetting sight. Selecting the system OFF resets the FINE mode and the Laser Energy system auto-fire function. The target acquisition system is taken off-line by any of the following:-

                    firing Photon Bolts
                    collision
                    selection of STEER mode


## TRANSPONDER

Controls:   f1   f3   f5   f7   R

Operation:  the above controls have the following functions:

            f1  -  select transponder ON
            f3  -  select transponder to STANDBY
            f5  -  select transponder OFF
            f7  -  change transponder output selection

Alone amongst all craft only the Interdictor can alter the output of its transponder to imitate other craft types. The f7 key will only function if the transponder is switched ON or to STANDBY. You are advised to ensure that the transponder is in STANDBY mode before using it since if you change your selection while the transponder is ON this will be detected by a target with a serviceable transponder. Select ON only when you have selected the desired output.

The last transponder control, the R key, is used to select the standby transponder transmitter to ON and can only be used when flying an approach to starbase (when deflector power is down). It sets your transponder to the REC mode essential to starbase recovery.

Note that the transponder controls are not available during light speed cruise due to retraction of the Lewis array.

## SIMULATOR

Controls:   S  Z  I  O  £  =  ↑  ←  1  2  3  4  5  6

Operation:  selection of S while at rest in a starbase launch bay with main power ON puts your on-board computer into simulator mode of operation. In this mode you never actually leave starbase but scenarios are simulated for you to your own selection. Z switches the simulator OFF if you change your mind after selection and again this is only available while at rest in a launch bay. Note that the simulator is automatically switched OFF after a successfully simulated approach to starbase or your simulated death. In either event you will be returned to the at-rest in a launch bay situation and if you wish to continue simulator operation you must reselect it ON.

You are given a slow motion option which beginners are advised to make full use of. Select I for slow motion IN and O for slow motion OUT. Events run at approximately half normal speed with slow motion engaged. Slow motion cannot be selected before launch.

The £ key pauses the action and the = key stops the action. To restart after use of the = key use the ↑ key. Make full use of the pause and stop keys as a beginner, to study what is happening both inside and outside your craft - especially on recovery to starbase.

Keys 1 to 6 select encounters in the following manner:-

                    1  -  Interdictor Mk 3
                    2  -  Gallanic Cruiser
                    3  -  Meson Torpedo
                    4  -  Jahdran Aggressor
                    5  -  Freighter
                    6  -  Starbase

All encounters may be selected from light speed cruise. Meson Torpedoes and Freighters may be either Federation or Alliance. Since they are light speed capable the Interdictor, Gallanic Cruiser and Jahdran Aggressor may be selected while you are not at light speed cruise, but you may have to hold down the associated key for a few seconds before the simulator will produce one. At conventional cruise you are unable to select a Meson Torpedo or Freighter contact since the chances of two ships at conventional speed encountering each other in space are billions to one against!

If you hold down the ← key while you make any of the selections 1 to 5 the target ship will appear stationary in space. It will not move, fire or respond to you in any way; use this facility to practice your visual identification and rudimentary manoeuvre and firing techniques. Selection of 6 will give you a simulated starbase approach, though if the simulator reaches destination starbase before 6 is selected it will give you an undemanded recovery simulation.

SUMMARY OF CONTROLS

| | | |
|---|---|---|
| POWER ON | * | |
| COCKPIT LIGHTING | INST | ON |
| | CLR | OFF |
| LAUNCH MASTER SWITCH | RIGHT SHIFT | |
| MANOEUVRE CONTROLS | CRSR DOWN | LEFT |
| | CRSR RIGHT | RIGHT |
| | CBM | DOWN |
| | RUN/STOP | UP |
| STEER MODE | S | SELECT |
| | Z | CANCEL |
| SPEED CONTROLS | LEFT SHIFT | DECELERATE |
| | RIGHT SHIFT | ACCELERATE |
| | SHIFT LOCK | DECELERATE LOCK |
| WEAPONS SYSTEMS | CTRL | ON |
| | RET | OFF |
| | L | LASER ENERGY SYSTEM |
| | P | PHOTON BOLTS SYSTEM |
| | A | LASER AUTO-FIRE ON |
| | < | LASER AUTO-FIRE OFF |
| | FIRING BAR | |
| TARGET ACQUISITION | > | ON |
| | < | OFF |
| | F | FINE MODE ON |
| TRANSPONDER | f1 | ON |
| | f3 | STANDBY |
| | f5 | OFF |
| | f7 | CHANGE OUTPUT |
| | R | RECOVERY MODE |
| SIMULATOR | S | ON |
| | Z | OFF |
| | I | SLOW MOTION IN |
| | O | SLOW MOTION OUT |
| | £ | PAUSE |
| | = | STOP |
| | ↑ | RESTART |
| | ← | PARALYSE TARGET |
| | 1 | SELECT INTERDICTOR MK3 |
| | 2 | SELECT GALLANIC CRUISER |
| | 3 | SELECT MESON TORPEDO |
| | 4 | SELECT JAHDRAN AGGRESSOR |
| | 5 | SELECT FREIGHTER |
| | 6 | SELECT STARBASE |

CHAPTER 3

SIMULATOR OPERATION FOR THE BEGINNER

Before launching in the simulator you should ideally read the two preceding chapters of this section. However, by sensible use of the simulator pause and stop controls it is possible to learn about the instrumentation and controls while actually flying the simulator. If this is your approach then the following paragraph will at least get you launched on your first simulator trip.

Enter your initials and surname at the Starbase Central Records Office Registration Department and press the return key. Aboard the transporter on your way to your craft you will be offered various sortie options, varying in transit distance and intensity of traffic activity according to latest intelligence reports. You should opt for a sortie of short transit distance and light activity, if available, since the sortie you choose now will be the one on which you have to launch when you have finished with the simulator. Once aboard your craft select cockpit lighting ON if required (* INST key) and switch power ON (* key). Select S to switch the simulator ON then press and hold the RIGHT SHIFT key for a few seconds. You are now on your way out of starbase. The four digit display below the central VDU indicates your relative velocity and you can accelerate using the RIGHT SHIFT key to a speed of 600/sec quite safely to reduce launch time. Be aware that if you accelerate beyond 750/sec you will be shot down by starbase auto-defence systems. Note that the ranger instrument near top left is decrementing as you proceed down the tunnel - it is indicating range to go before being clear of starbase. At this stage touch no other keys during launch. Now refer to this Section, Chapter 2 and operate the transponder, weapons, manoeuvre and convential speed controls and targetting. Familiarise yourself with them and get to know your way around the instrument display by reference to this Section, Chapter 1

You are advised to conduct your first simulator sortie in slow motion. To achieve this, press I. Now try selecting STEER MODE with the S key. Once at light speed select a contact, 1 - 5, in conjunction with the ← key on early sorties. This paralyses the contact. Refer to this Section, Chapter 2 for a full description of how the contact selectors function and the ship types they give. Practise visual identification of the paralysed targets. Fly up to and manoeuvre around them then use your weapons systems against them. Remember to make full use of the 'Pause' and 'Stop' keys (£ and =) whenever you wish to stop to consult the manual or pause to study the cockpit display. While manoeuvring against paralysed targets practice coordinating the information given you by the ranger, doppler velocity indicator and target acquisition system - see if you can get it all "tied in".

As you progress and become more proficient try non-paralysed targets to see how they behave, how they respond to your transponder, to being fired on etc.. Note that while at light speed the ranger indicates distance to starbase. If you let this decrement to zero the simulator will throw an approach to starbase simulation at you. Do not worry if you are shot down at first attempt - most pilots are! Remember that it is just a simulation at this stage. Refer to Section 4, Chapter 1 for recovery

parameters.   While  practising  recoveries, again make full use  of  the
'Pause',  'Stop'  and  'Slow Motion' controls on  early  practice  runs.
Approach  to  starbase  can also be simulated by selecting 6  from  light
speed  cruise.   If  you  fly an approach to starbase  in  the  simulator
without  having  selected  an  encounter with another  craft  and  having
maintained  the  centreline during launch, then at initial  approach  you
will be placed inside the tunnel and will have no steering adjustments to
make.   This  will enable you to concentrate on the other recovery criteria
- speed, transponder and weapons.

As  you become more proficient so you should read and absorb more of  the
manual.  Try tackling it from front to back since everything is presented
in logical sequence.

The simulator is really very realistic.  Do not leave it until you are at
least  reasonably  proficient  in  combat  and  almost  infallible  during
approach  to  starbase!  Do not become just one more dead  sub-lieutenant
lost on his first sortie.

## S E C T I O N   F O U R

### CHAPTER 1

### SORTIE FORMAT & BASIC TUITION

Each sortie is divided into four distinct phases.   They are:-

    1  Launch from starbase
    2  Transit with encounters
    3  Recovery to destination starbase
    4  Administrative procedures at destination starbase

The  simulator  will  faithfully imitate phases 1 to 3, but it  will  not
simulate  the  administrative  procedures  of  phase  4.    Each  phase  is
discussed in detail below.

### PHASE 1:   LAUNCH FROM STARBASE

On  launch  from starbase you should fly along or close to  the  approved
departure  path  (tunnel)  at a speed between 10 and 75Q/sec  with  your
weapons systems switched 'OFF' until you emerge into free space.

If  your  speed  is below 16Q/sec or greater than 69Q/sec the  first  red
warning  light  on  your  recovery computer hazard  warning  system  will
illuminate (see Ch 1, Sec 3, Sub I).

This warning is advisory and you incur no penalty while this light is on.
If  your speed falls below 10Q/sec (initial launch speed) or goes  beyond
75Q/sec then you will be shot down immediately by starbase auto-defensive
systems.

If  you  depart from the tunnel centreline and your displacement  becomes
greater  than  three tunnel widths then the second warning light on  your
recovery  computer  hazard warning system will be illuminated (see Ch  1,
Sec 3, Sub I).

This  warning is also advisory and again you incur no penalty while  this
light  is  on.   However if your displacement becomes  greater  than  six
tunnel  widths  you  will  be shot down  immediately  by  starbase  auto-
defensive systems.

If you switch on your weapons system the fourth red warning light on your
recovery computer hazard warning system will illuminate, and the starbase
auto-defensive  systems   tracking  radars  will lock-on  to  your  craft
causing  illumination  of  the lock-on warning light  above  the  doppler
display (see Ch 1, Sec 3, Sub 1).

If  the weapons system remains on, the accumulator lights at either  side
of  the  lock-on  warning  light  will indicate  the  amount  of  lock-on
distance/time  quotient  used.   When you reach  the  maximum  permitted
quotient, starbase auto-defensive systems will shoot you down.

The recommended technique for the starbase launch is to accelerate to a speed in the mid sixties, make no steering adjustments at all and keep your weapons systems OFF.


## PHASE 2:   TRANSIT WITH ENCOUNTERS

During this phase of the sortie you have to transit to your destination starbase in a series of light speed jumps punctuated by encounters with other craft. Light speed alignment and navigation are performed automatically after you have selected STEER mode. Note that you cannot enter STEER mode if another craft is within your instrument detection range.

You are expected to investigate all contacts – unless your craft is so heavily damaged as to make combat inadvisable – and to deal with them if they are hostile. Remember to switch your targetting system on in order to receive steering advice for target acquisition (refer to Section 5).

You will only ever meet single contacts from light speed because if your craft encounters more than one contact craft at any location it ignores them and remains at light speed. Similarly if you are in contact with another craft no further craft will appear from light speed. In order to minimise the number of contacts that you meet during a sortie you are advised to spend as little time as possible alone at sub-light speeds. Enter STEER mode as soon as you have destroyed or lost contact with another craft.

This phase of the sortie terminates when you reach destination starbase at light speed and are dropped into sub-light speed for recovery.


## PHASE 3:   RECOVERY TO DESTINATION STARBASE

This is the most daunting phase of flight for most new pilots. The procedures and limitations outlined below seem complicated, but you will find in practice that if you simply maintain speed, set the transponder to REC(overy) mode, leave your weapons OFF, assess your horizontal and vertical displacements from the tunnel and take these out ONE AT A TIME, with SMALL steering adjustments you will survive every approach! Invariably the cause of death during approach is attributable to trying to take out both horizontal and vertical displacements simultaneously and over-steering, leading to over-correction, a worsening situation, more over-correction, panic and, inevitably, destruction. More details are given later under "Recovery Technique". It is only by meeting the criteria below that starbase can be certain that you are not hostile.

Recovery criteria are divided into three parts. They are:

Criteria to be met from the start of the recovery to a range of 140KQ. (Laser ranger green sector, outside Alliance laser weapons range of starbase.)

Criteria to be met from 139KQ to 100KQ range. (Laser ranger red sector, inside Alliance laser weapons range of starbase.)

Criteria to be met from 99KQ range to docking bay. (Laser ranger yellow sector, inside Federation laser weapons range of starbase.)

The criteria are as follows:-

### Part 1:   Start of Recovery to 140KQ

You must remain within three tunnel widths of the centreline with speed between 25Q/sec and 75Q/sec with weapons 'OFF'.

If your speed falls below 31Q/sec or exceeds 69Q/sec then the first red warning light on your recovery computer hazard warning system will illuminate. This warning is advisory and you incur no penalty while this light is on. If your speed falls below 25Q/sec or goes beyond 75Q/sec then you will be shot down immediately.

If your displacement from the centreline exceeds three tunnel widths the second red warning light on your recovery computer hazard warning system will illuminate and the tracking radars will lock-on to your craft, causing illumination of the lock-on warning light and loss of available remaining lock-on distance/time quotient.

If your displacement exceeds six tunnel widths you will be shot down immediately.

If you switch your weapons ON then until you switch them OFF the fourth red warning light will illuminate, and the light above the doppler display will indicate a tracking radar lock-on. If you have not set your transponder to REC(overy) mode the third red warning light will illuminate, though no tracking radar lock-on will occur during this section of the recovery.


### Part 2:   From 139KQ to 100KQ

You must be and remain within the tunnel with speed between 25Q/sec and 75Q/sec with weapons 'OFF' and transponder set to REC(overy) mode.

The Part 2 criteria for both speed and weapons are identical to those of Part 1.

If your craft is outside the tunnel then the displacement warning light will be illuminated and you will get a tracking radar lock-on. If your displacement from the centreline exceeds three tunnel widths you will be shot down immediately.

If, by the commencement of Section 2, you have not yet set your transponder to REC(overy) mode the transponder warning light will be illuminated and you will get a tracking radar lock-on.


### Part 3:   From 99KQ to Docking Bay

You must remain within the tunnel, with speed between 25Q/sec and 75Q/sec, with weapons OFF and transponder set to REC(overy) mode.

The Part 3 criteria for both speed and transponder are identical to those

of Part 2.

If your craft is outside the tunnel you will be shot down immediately.

If your weapons are switched ON you will be shot down immediately.

The above criteria are all presented in Appendix II in tabular form for quick reference.


## Recovery technique

When you first arrive at destination starbase you will ALWAYS be on a flight path which is parallel to the tunnel, though you may be displaced from it by up to two tunnel widths. Because you are flying parallel to the tunnel your displacement will not increase, so take your time, assess the situation.   THERE IS PLENTY OF TIME IF YOU ACT CALMLY AND CORRECTLY.

Let us consider the worst possible case.  Suppose you are displaced from the recovery tunnel  by two tunnel widths in both  the  horizontal  and vertical  axes.  For the sake of the example we will assume that you  are high and to the left, i.e. the tunnel originates apparently in the centre of your targetting sight and passes low and to the right of your craft as you  fly  along  parallel  to it.  As long as the origin  of  the  tunnel appears  in the centre of your sight then you must be flying parallel  to the tunnel and therefore your displacement remains constant.

Remove the displacement one axis at a time — if you try to deal with both of  them  simultaneously you will probably land yourself in  deep  water. Let us assume that you have chosen to take out the vertical error first — since  you  are  high  you must dip the nose of  your  craft.   DO  NOT OVERSTEER.   You  cannot make a displacement  disappear  instantaneously; steer  down  only  one or two notches to place the origin of  the  tunnel slightly high in your sight, and wait.  Slowly the tunnel's visual aspect will  change  as  you descend relative to it.  It will move  slowly  from passing  low  and to the right of your craft to passing level and to  the right  of  your craft.  When this state has been achieved  you  obviously need  to  regain a parallel flight path, otherwise you will pass  through the  tunnel's horizontal centreline and end up low relative to it, so  at this  point steer up by the exact amount that you initially steered  down. Watch  the  display  for  a  few seconds to  ensure  that  you  have  re-established a parallel flight path — if you have not then the tunnel will wander  — before dealing with the horizontal displacement.  If  you  are satisfied  with  your  vertical positioning then make  no  more  vertical adjustments during the recovery.

To take out the horizontal displacement employ the same technique.  Steer right  by  only one or two notches and wait.  Slowly the tunnel's  visual aspect  will  change as you approach it.  It will appear to  be  swinging from  the right towards you.  When you have passed through the outer left wall  of  the tunnel steer back left by the same amount as  your  initial right adjustment — again, if you do not do this you will pass out through the far side of the tunnel.

Remember,  you  do  not need to be right in the centre  of  the  recovery tunnel.   As  long as the central pip of your sight is inside the  tunnel and  you are flying parallel to it — the origin of the tunnel is  centred

under the pip — then you are inside and safe.

This  now leaves only the transponder to deal with.  Set it to REC(overy) mode.   You  can, of course, get this out of the way before you start  to eliminate displacements, if you so wish.

You  are strongly advised to leave speed alone during the approach.   You will  be doing 500/sec which is just about ideal.  Now all that you  have to  do is leave your weapons off, preferably sit on your hands, and enjoy the ride down the tunnel to the docking bay!

Do  not worry if your early attempts in the simulator fail.  This happens to  most pilots.  Once you grasp the basic idea, however, you should find it  relatively  easy  to get in from any approach.  It  is  only  because flying  an Interdictor successfully into a starbase is so different  from any flying you may have done before that it seems so daunting.


## PHASE 4:   ADMINISTRATIVE PROCEDURES AT DESTINATION STARBASE

After  your  craft  is secured in the docking bay you will  be  taken  by transporter  to the Statistics Department of the Starbase Central Records Office.   Here  your sortie will be assessed, your kills listed and  your promotion,  demotion  or deportation will be conferred according to  your performance.   The Statistics Department is able to credit you with  your kills  from  records kept by your own on-board computer  cross-referenced with  information  gathered by the Starbase Terminal  Monitoring  Service which  picks  up  termination signals transmitted by craft  as  they  are destroyed.  Each craft will be credited by type and serial number, with a star  indicating  that you did receive the craft's serial number on  your transponder.

You  will  be  heavily penalised for  any  Interdictors  or  Federation Freighters  that  you  destroy,  though you will only  be  penalised  for destroying  a  Federation  Meson Torpedo if you were in  receipt  of  its serial  number  during engagement.  Your rank and grade display  will  be continuously updated as kills are credited.

At  the end of the assessment you will be offered the opportunity to take your own copy of Starbase performance files.  You are advised to do so.

When  you  have  finished  in  the  Statistics  Department  you  take  a transporter  to the Registration Department.  Here you can re-register by initials  and surname to continue your career immediately or else take  a period of "shore leave" aboard the starbase, the choice is yours.

Phase  4  of  a sortie is the only phase which is not simulated  by  your built-in simulator.  When Phase 3 of the simulated sortie is complete the simulator  is disengaged and you are once again in your launch bay  ready to fly another simulation or launch on the "real thing" as required.

CHAPTER 2

### STARBASE AND ITS FUNCTIONS

The C Mk 4 starbase is a truly magnificent creation. Virtually a man-
made planet, being 29KQ in diameter, each starbase has fifty docking
bays, ten launch bays, powerful automatic defence systems, full
servicing, replenishment and administrative facilities and its own
sizeable population. Departments and facilities of direct interest to
the Interdictor Pilot are dealt with below.

### Starbase Central Records Office Registration Department

Pilots register themselves at this department by initials and surname
before each sortie. The department runs an identity check against the
latest pilots' personal records files to determine whether you are a
novice reporting for your first duty or a veteran. These record files
are able to hold personal details on more than two hundred pilots and
after checking the files this department will advise you of your current
rank and grade and will assign you to your craft and launch bay. Of
course, it is possible that a new pilot will attempt to register under
the name of a pilot who is listed as retired, deceased or deported. Such
registrations will be queried and, if confirmed, previous records under
that name will be destroyed.

Entries on the Registration console must be of at least four characters
and if you make an error in entry use the LEFT ARROW key for deletions.
Use the return key on completion of your entry. If the department
queries your entry, use the Y key to confirm that starbase records are
correct as they stand or the N key to deny them.

### Mission Assignment Office

In the transporter en-route from the Registration Department to your
launch bay you will be offered various sortie options. You will be
offered from two to five options varying in the length of the transit to
your destination starbase (from 15 to 55MQ) and the reported traffic
intensity based on latest intelligence reports. Generally the higher
your rank and level of experience the more demanding will be the options
offered to you.

The traffic intensity reports are a general guide and, though unlikely,
it is possible to meet more contacts on a route reported as light
activity than a similar route reported as average. The traffic intensity
grades are as follows:

|             |              |
|-------------|--------------|
| very light  | heavy        |
| light       | very heavy   |
| moderate    | intense      |
| average     | very intense |

Make your selection by depressing the number key corresponding to your
preferred option.

### Starbase Central Records Office Statistics Department

After successful sortie completion and docking, pilots report to the
Statistics Department where their performance is evaluated. This
department interrogates your craft's on-board computer and, cross-
referencing information with the records of the Starbase Terminal
Monitoring Service, credits you with your kills. Each kill is displayed
to you by craft type and serial number, an asterisk appearing with the
serial number if your transponder actually displayed this during combat.

You will be credited with Alliance kills, while kills registered against
Federation craft will count heavily against you! The exception to this
is that you will be forgiven a kill against a Federation Meson Torpedo if
you did not receive its serial number during combat.

The display of your rank and grade will be continuously upgraded as your
kills are considered, with grades ranging from Z (low) to A (high) and
the rank structure being as listed below:

                    Sub lieutenant
                    1st lieutenant
                    Lieutenant Commander
                    Commander
                    Captain
                    Commodore

If you should fall below the rank of Sub lieutenant grade Z through acts
against Federal shipping, you will be deported to one of the eight prison
planets. Attainment of the rank of Commodore brings with it honourable
retirement.

When evaluation is complete you have the option to take a copy of
starbase performance files. You are advised to do so. The procedure is
as follows:

<u>Tape-based records system</u>

    (i)    Insert and position a blank tape
    (ii)   Press D
    (iii)  Press play & record
    (iv)   When complete, press stop key

<u>Disk-based data records system</u>

    (i)    Insert a previously formatted disk
    (ii)   Press D

You are advised to make several copies of the records. If you are
keeping disk based records you will need a different disk for each copy
taken as any previous performance file will be overwritten. Ensure that
each disk you use has a unique ID.

From here you catch a transporter back to the Registration Department.
There you may register for another sortie immediately or else go on
"shore leave". You will find that starbase is able to provide you with
all the comforts of your own home!

Starbase Terminal Monitoring Service

All craft types, Federation and Alliance, are fitted with a transmitter which sends out an omni-directional coded data stream if the craft is terminated. The Starbase Terminal Monitoring Service receives and logs these signals, adding pilot data to craft data if the craft is Federal, and allocates a cause code to Federal terminations. These decode as follows:

        1  —  terminated by weapons fire
        2  —  collision with another ship
        3  —  Meson Torpedo impact
        4  —  terminated by starbase automatic defence systems

<div align="center">

S E C T I O N   F I V E

CHAPTER 1

COMBAT ADVICE

</div>

There is no substitute for experience — preferably gained in the simulator — though you can save training time and profit considerably from the experience and advice of those who have gone before you.

General

If you do not know what it is, DO NOT OPEN FIRE. You will incur severe penalties for destroying friendly craft. Remember also that a fellow Interdictor, in particular, is capable of inflicting considerably more damage on you than Alliance craft with its rapid firing laser weapons.

Do not approach too close to a freighter if you have not received a hostile craft serial number on your transponder. All freighters, Federation or Alliance, are required by convention to transmit their serial number and only fail to do so if their transponder is inoperative. All freighters are also under instruction to open fire on any craft which approaches too close. Without a serial number you cannot possibly identify a freighter as friend or foe so STAY CLEAR OF IT.

With the exception of freighters it is reasonably safe to assume that a craft which opens fire on you is hostile.

Craft Identification

Hints on early identification of contact craft:-

    (i) Do not rely on an incoming craft type transponder transmission for craft identification — remember that an Interdictor can transmit whatever it wishes. If, however, the transmission is accompanied by a craft serial number transmission then no doubt remains — X series numbers are Alliance while C series numbers are Federation.
    (ii) If the contact alters speed note the acceleration-deceleration rate. A Meson Torpedo accelerates at approximately half the rate of any other craft. This will enable you to identify or rule out this craft type.
    (iii) Take an early look at how strong his deflectors are. A very strong set of deflectors will belong to a freighter, Interdictor or Jahdran Aggressor. Gallanic cruisers tend to have medium to weak strength deflectors. Be aware, however, that a weak set of deflectors could equally belong to a battle-damaged Interdictor or other craft. A Meson Torpedo will always have a deflector strength of 50 GeV since, if at all damaged, it will always destroy itself against the deflector shields of its attacker. Learn to recognise this 50GeV deflection on your deflector strength indicator, but again be aware that this can

also indicate another craft type with battle damage.
(iv)  If a contact with a deflector capacity of 50GeV has a speed
in  excess  of 650/sec it must be a Meson Torpedo since they  are
not speed limited by deflector capacity as are all other ships.
(v)   If a contact alters its craft type transponder transmission
it must be an Interdictor.
(vi)  If  a  craft  attempts to run away  shortly  after  initial
contact it is probably a freighter.
(vii) A  contact  that appears while you are alone  at  sub-light
speed  cannot  be a Meson Torpedo or a freighter since these  are
not light speed capable.

Hints on close range identification of contact craft:-

(i)    Visual  identification  becomes  possible  only  at  close
ranges.
(ii)   The Gallanic Cruiser has a unique X-wing configuration.
(iii) The  Meson  Torpedo is the smallest of all craft types  and
will remain as an apparent dot until very close range - beware!
(iv)   The  Interdictor  and  Jahdran  Aggressor  are  visually
indistinguishable until very close range.  They both have an H-
wing  configuration  and can be distinguished only by the  cross-
bars  on the Interdictor strake fins.  The Jahdran Aggressor does
not have these cross-bars.
(v)    If you are behind it and it opens fire at close range it is
a freighter as only freighters are fitted with a tail turret.
(vi)   Practice visual identification in the simulator.


Use of Transponder

As  a  general rule you should keep your transponder in  'STANDBY'  mode.
This  gives  you the advantage of being able to interrogate  targets  and
receive  their transmissions, if any, while not providing any information
yourself.

If you are receiving a hostile transmission it is a good idea to transmit
an  Alliance  ship type yourself.  However, be  aware  that  since  you
actually look very much like a Jahdran Aggressor use of this setting will
delay an enemy's visual identification of your craft.

If  you  are  in  bad  shape  and  wish  to discourage a contact from
investigating you, transmitting MESON TORPEDO may suffice.  Be aware that
if  your  ploy  does not work you will be identifiable from  fairly  long
range  due  to the complete dissimilarity between yourself and what  your
transmission declares you to be.

You  can sometimes save fuel and learn a lot about a contact by switching
your  transponder 'ON' and observing what effect, if any, this has on his
behaviour.   If  you  do  this it is always prudent to be  truthful  and
transmit  'INTERDICTOR' since a Federation Meson Torpedo will lock on  to
and  attack any craft from which it has received a hostile transmission -
even if you subsequently revert to 'INTERDICTOR'.

Always  set  your  transponder  to 'STANDBY'  mode  while  changing  your
transmission.  This  prevents  transmission  of  intermediate  settings
through which you pass.

Be  aware that your transponder settings cannot be altered while at light
speed  cruise  so ensure that it is configured as required  before  light
speed jump occurs.  It is recommended that you set it to standby.

Your  transponder  settings  will obviously have no effect upon  a  craft
whose  own  transponder is inoperative through battle damage, nor upon  a
freighter, since they are fitted with a transmit-only device.

Use of **Weapons** Systems

Photon Bolts System

(i)    Your  Photon  Bolts  System  is your  only  weapons  system
capable  of  hitting  a  target  beyond  a  range  of  100KQ  and
effectiveness increases with reduced range.
(ii)   Photon Bolts travel at finite speeds and will usually cause
a target to evade when fired.  This system is therefore best used
against  slow  moving  targets.  If you use them against  a  fast
mover,  try  to anticipate evasion and get a 'guns lead' on  the
target,  since  Photon bolts will always proceed in a direct line
towards  the  point of aim at the time of release - they do  not
inherit  angular  velocities  from any manoeuvring you may be
executing at firing time.
(iii) Firing  a  Photon  bolt  salvo will  reset  the  targetting
computer.
(iv)   Photon bolts are useless against Meson Torpedoes.

Laser Energy System

(i)    Your  Laser  Energy System is limited in range to 100KQ  and
effectiveness increases with reduced range.
(ii)  You have a very much faster rate of fire with your lasers in
manual  mode  than  you do in 'AUTO', though  'AUTO'  has  the
advantage  of making every shot count and reduces your  workload.
'AUTO'  is best used against high-manoeuvring targets or  against
running  Gallanic  Cruisers  and Jahdran Aggressors  to  conserve
ammunition.

Weapons Selection

(i)    Always  select  a weapons system 'ON' when you encounter  a
contact.   You might not need it but better be safe than sorry -
remember  it  takes  about 18 seconds from selection  to  on-line
readiness.
(ii)   NEVER switch weapons on in starbase airspace.


Speed Control and Manoeuvre

If  you  are on the tail of an evading target use a slower speed than  he
is.   This  may  seem a strange act but the slower craft is always  more
manoeuvreable  and the evasion attempts of the contact craft will usually
prevent him from getting too far away from you.

Conversely,  if an attacker is on your tail and you cannot shake him off,
cut  your  speed  and  turn hard.  A fast moving  opponent  will  usually

overshoot and enable you to turn the tables on him.

Beware of collision! The greater burden of avoidance usually rests with the faster moving craft.

Use your speed to minimise the period of time during which you are within range of Alliance Laser weaponry while the contact is outside your own laser weapons range - if you have your laser energy system selected.

If a contact is firing Photon bolts at you keep your speed high and evade if your photon bolts warning light illuminates. At lower speed you will never evade them.

## Coping With System Failures

If your laser ranger has failed - causing also a failure of your target deflector strength indicator - you will have to rely on visual impression for range information. The only information you might be able to glean about deflector strength will be from high speed contacts. If the speed is very high then the deflector strength must also be high unless the contact is a Meson Torpedo.

If your axial advice indicator has failed - causing also a failure of your V2 indication - you can, with practice, guage whether the contact is closing or retreating by reference to the Doppler Velocity indicator and relating this to your own speed and the contact placement relative to your own axes. You can also learn to guage his absolute velocity from these sources.

If your stabilisers have failed and you are in close combat with another craft cut your speed to zero to provide you with a stable firing base.

## APPENDIX I

### CRAFT DESCRIPTIONS

#### Interdictor MK3

Fast, agile combat patrol craft, light speed capable.

| | |
|---|---|
| Operating authority | Federal Inter-Starbase Patrol Force |
| Deflector shield capacity | 150 GeV |
| Maximum speed(sub-light) | 100 Q/sec |
| Acceleration rate | 18 Q/sec$^2$ |
| Fuel capacity | 90 kg atomic core |
| Operational Features | auto light speed navigation |
| | rapid-fire long range laser weaponry |
| | extra long range, high powered photon bolt weaponry |
| | full feature transponder |
| | full feature target acquisition system |
| | full feature threat evaluation system |
| | simulator operation mode |

#### Gallanic Cruiser

Medium speed combat patrol craft, light speed capable.

| | |
|---|---|
| Operating authority | Gallanic Patrol Command |
| Deflector Shield Capacity | 86 GeV |
| Maximum speed (sub-light) | 70 Q/sec |
| Acceleration rate | 15 Q/sec$^2$ |
| Fuel capacity | 47 kg atomic core |
| Operational features | medium-fire extra long range laser weaponry |
| | 2 man crew |
| | basic transponder |
| | basic target acquisition system |
| | cargo carrying capability |

#### Meson Torpedo

Fast unmanned craft (drone), non-light capable

| | |
|---|---|
| Operating Authority | Federal Inter-Starbase Patrol Force/ Gallanic Patrol Command |
| Deflector shield capacity | 50 GeV |
| Maximum speed | 100 Q/sec |
| Acceleration rate | 10 Q/sec$^2$ |
| Fuel capacity | 15 kg atomic core |
| Operational features | auto lock-on to hostile transponder |
| | medium range tele-visual identification of hostile craft |
| | photon bolt immunity |
| | basic transponder |
| | high velocity auto-home to target for impact attack |
| | maximum speed not damage related |

## Jahdran Aggressor

Fast, agile combat patrol craft, light speed capable.

| | |
|---|---|
| Operating Authority | Jahdran Council for Hostilities |
| Deflector shield capacity | 150 GeV |
| Maximum speed | 100 Q/sec |
| Acceleration rate. | 18 Q/sec$^2$ |
| Fuel capacity | 82 kg atomic core |
| Operational features | auto light speed navigation |
| | medium-fire extra long range laser weaponry |
| | extra long range, high powered photon bolt weaponry |
| | basic transponder |
| | full feature target acquisition system |
| | basic threat evaluation system |

## Freighter

Fast cargo carrier, non-light capable.

| | |
|---|---|
| Operating Authority | Federal Transportation Command/ Jahdra-Gallanic Supply Corps |
| Deflector shield capacity | 150 GeV |
| Maximum speed | 100 Q/sec |
| Acceleration rate | 17 Q/sec$^2$ |
| Fuel capacity | 250 kg atomic core |
| Operational features | 9 man crew |
| | 2 twin extra long range laser-cannon ball-turrets |
| | very basic transponder |
| | large cargo hold capacity |

**APPENDIX II**

**RECOVERY CRITERIA**

| LASER RANGER SECTOR | CRITERIA WHICH CAUSE WARNING LIGHTS WITHOUT REPERCUSSIONS | CRITERIA CAUSING TRACKING RADAR LOCK-ON | CRITERIA CAUSING INSTANT TERMINATION |
|---|---|---|---|
| GREEN | Transponder not set to REC mode<br>Speed 25-30 or 70-75 | Displacement more than 3 widths<br>Weapons ON | Displacement more than 6 widths<br>Speed >75 or <25 |
| RED | Speed 25-30 or 70-75 | Craft outside tunnel<br>Weapons ON<br>Transponder not set to REC mode | Displacement more than 3 widths<br>Speed >75 or <25 |
| YELLOW | Speed 25-30 or 70-75 | Transponder not set to REC mode | Outside tunnel<br>Weapons ON<br>Speed >75 or <25 |