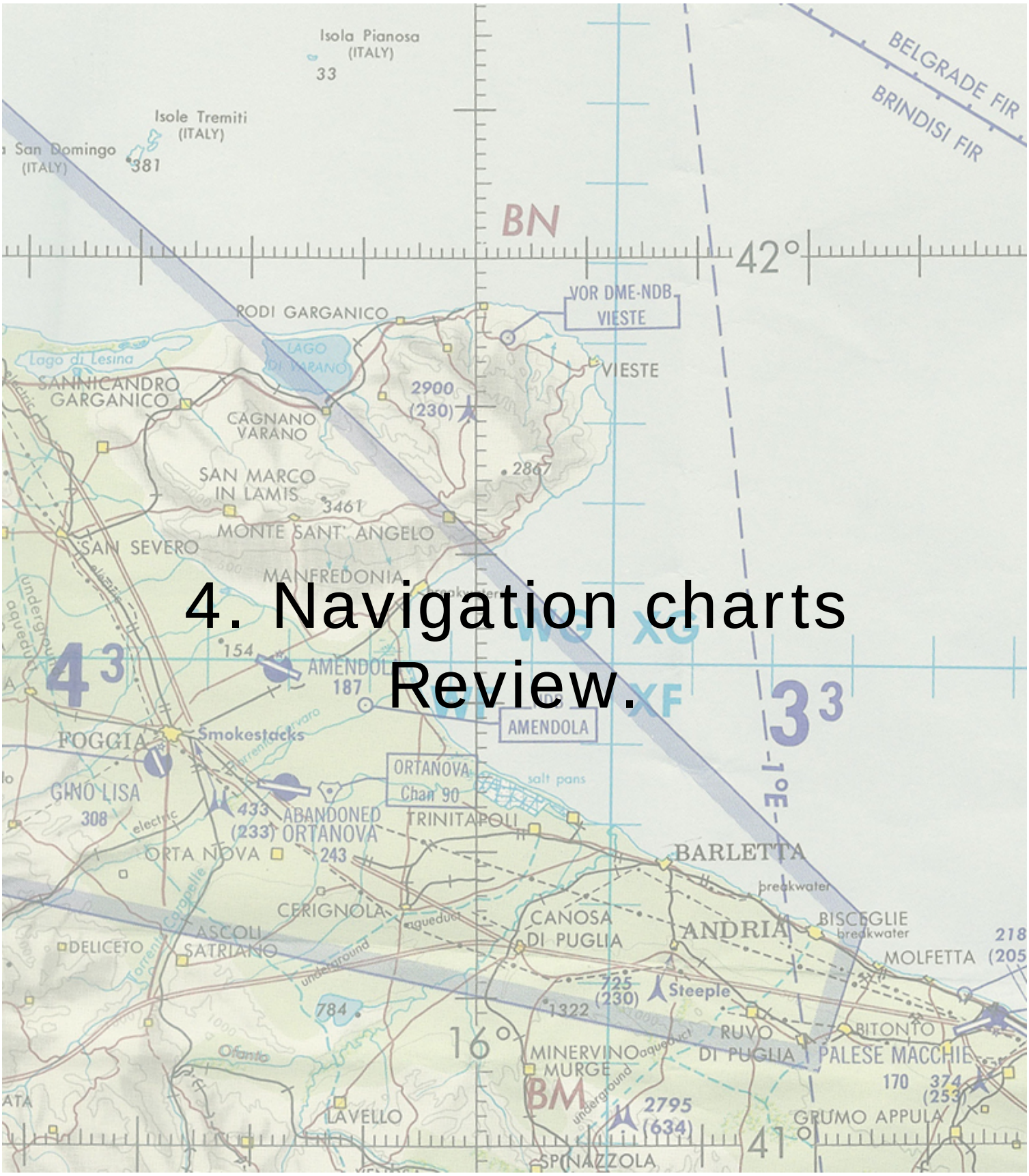


4. Navigation charts Review.

Last Reviewed: 6th Nov 2006 11:20Z

Every pilot needs charts, even the fighter pilots. Charts are a mean to ensure safety when navigating, especially in an aircraft rich environment around airbases for instance. The falcon charts are heavily inspired from real navigation charts. Unfortunately, many real life aspects are not transposable in Falcon. Such as terrain altitude, runway orientation and type, radio navigation emitters… As a consequence real navigation charts cannot be used in our simulation. I decided to make a chart set for each South Korean airbase using the relevant real navigation charts where appropriate and a lot of guessing when I was lacking real world information. At this time the whole Korea is covered and I'm already working on the Balkan terrain.
Each set is made of an airport diagram, at least one departure chart and one approach chart per runway wherever possible. Some sets have more "special" charts as we will see later in this document.
One of the many downsides of F4 is that we only have tacan as far as radio-navigation stations are concerned. And worse, those tacans are only collocated to airbases. Most of the tacan IRL are also collocated to airbases, but often placed cleverer than in F4 where they are in the middle of the airbase, next to the runway, making tacan approaches always offset. There are also a lot more radio-navigation stations in real life. Especially the NDB (Non Directional Beacons) that are placed between 4 and 7 miles from the threshold and correctly aligned with the approach track. Unfortunately we don't have those in F4 although an INS waypoint can be used to replace them.
The tacans we have in most of the currently available Falcon versions are accurate and correspond both in range and channels at the real world data. Although real life data have probably been updated since that work was done back in the SP2 days.

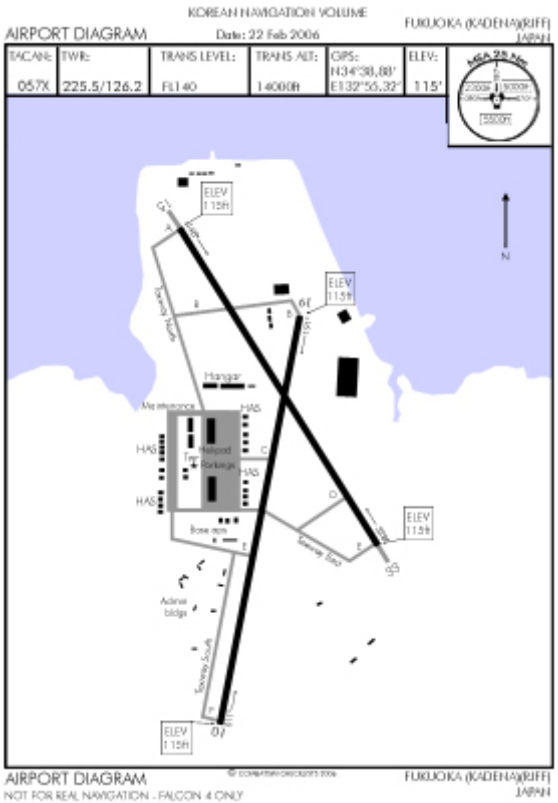
The charts have been created (for most of them) with BMS and the elevated terrain BazT. The elevation figures are correct only when using that version. Although I changed version from time to time, I always tried to check the final work with this 'master' working version.
The charts should remain useable whatever version of F4 you use. FA Allied Forces users should be aware that some tacan changes may have occurred and I can't keep track of all of them to make sure the charts are accurate. I wish I could but I also want to stick as much as possible to the real world data and if F4AF developers decided to change tacan channels for whatever reasons, my bet is that they drifted from real world data and I prefer using these as much as possible. SP4, FF and BMS all have the real world data. Also different in F4AF are all the terrain elevation figures that will be quite lower (because of the lack of BazT) than the ones given by the charts (which is fine since you will then be safe using the charts altitude)
Aside from the above aspects the use of charts will remain the same throughout all flavours of F4.

Using charts will greatly enhance your ability to fly safe IFR. But don't make the mistake that you can get into the air without preparing your flight and your procedures. Charts induce a lot of planning, careful review of relevant procedures and you need to be prepared before starting to follow a specific route. Setting correctly the tacan frequencies, the instrument mode or the navigation system may take some time which is very precious when you need to scan the instrument to fly in the blind with a very high level of precision. Add to that the fact that when you really need it, the weather conditions might be very bad (one can hope) or it might be at night with a very high wind situation (and thus great drift) and you will realize that the sooner you set your airplane and the sooner your review the procedure and clear any unknown aspects (for instance the DME ARC initial and final headings) will greatly help you getting safely on the ground.

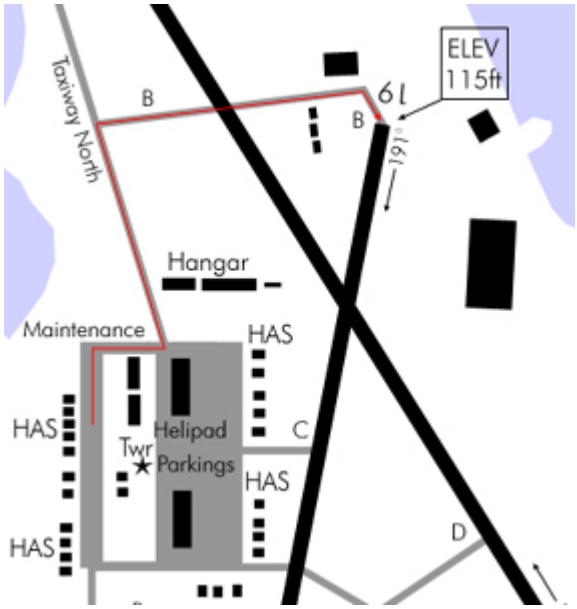
A final note sounding pretty obvious, but modern times force us to state the following: These charts are for simulation purposes only – don't use them in real life ☺

4.1 Airport Diagram charts

This chart is a vertical view of the airbase in F4. It has been redrawn from a satellite view in the 3D world, so it corresponds perfectly to Falcon. Although once again, depending on the version of F4 you will use, some objects may change (building missing or other ones placed). The important thing is that the airport and its layout are always the same.



The purpose of this chart is pretty obvious, it allows the pilot to taxi to anyplace on the airbase according to ATC instructions or multiplayer procedures of each squadron.
The runways are marked with their orientation: 15/33 and 01/19 in the Fukuoka example on the right. 15/33 means that the general orientation of the runway is running along the 150° heading and the reciprocal to 150° which is 150+180=330°. Only two large figures are painted on the runway pavement, there is no room for three. So it was decided to give the orientation with the two first number of the runway heading. Of course the precise orientation might be slightly different, such as it is the case in our example. Runway 19 of Fukuoka is actually 191°: 1 degree more than 190. So the reciprocal would be 1 degree more than 010: 011°. Indeed, 191-180=011°. The actual heading of the runway is always given along the runway edge, in full, with a black arrow. (See picture on the right)
The RWY lengths are of no importance in Falcon since they are mostly too short anyway, so I decided not to give them.



The taxiways are labelled from A to F or more whenever necessary. That will allow a multiplayer pilot to state is position very easily for other members of its flight. The leader can also state its taxi route from the parking position to the runway for all his flight members: “Sting flight, lead – taxi to runway 19 via taxiway North, Bravo. Of course it’s the ATC job to give such an instruction to the leader of the flight but since the F4 ATC is kind of lazy, it falls on the leader responsibility to keep his flight informed. As pictured above by the red line, the flight would then follow the assigned taxi route to the runway – provided they were initially parked at the HAS (Hardened Aircraft Shelter) Care should also be taken before crossing rwy 15/33 that there is no aircraft taking off or landing on that strip. Probability is low but better safe than sorry – you won’t loose your life over it, but you may loose more than an hour of mission planning and briefing.

Initially, I marked the place where the player's aircraft is supposed to appear from the UI as the MIL RAMP, but as my work slowly progressed – the entrance point changed, so the Mil Ramp is not accurate anymore and I even discarded on the last charts I did.
You may also have noticed, the charts always share the same colour codes. The runway and objects such as buildings and installations are always black. Tower is always a star symbol (★). Taxiways are always grey, ground is white and water is blue. The magnetic North is always pictured by a black arrow – for obvious reasons, I choose not to illustrate the magnetic variation. Most of the airport charts are oriented with the North pointing on top of the page, but in some cases, like the 08/26 airport diagrams, I preferred to rotate the whole airport layout so it may be printed larger. Thus on those charts, you may find a north arrow pointing toward the side.

Most indications on the airport templates are self explanatory. (I will explain the charts header later on)

Taxiways are labelled by capital letters starting with A. On the ground, you see those labels on yellow signs – so use them to taxi correctly.
In falcon, only the taxiways crossing to a runway are labelled. The ones parallel to the runways are not labelled - which of course is a serious breach of safety. I decided to call these according to their main direction from the centre of the airbase. So you may find taxiway North, South, East and West. With this information, any taxi route should be clearly stated.

Here's a list of some terms used which may not be understood directly:
HAS: Hardened Aircraft Shelter.
POL: Petroleum Oil Lubricant – basically some large tank
Twr: Control Tower
Apron: parking area for planes - mainly used on the airstrips charts
Base Ops: Stand for base operations; it's just some buildings I designed as such.
Mil Ramp: was initially designating the spot where the player would enter the 3D world but was abandoned in the process.

Each runway end has its elevation in feet given in a square box. Those are MSL (Mean Sea Level – altitude given with the level of the sea as zero.) In Falcon, it will not change because the entire airbase stands on the same tile with a fixed altitude. But in real life, you may have variations from one end to the other, telling the pilot if the runway course will climb or descend.

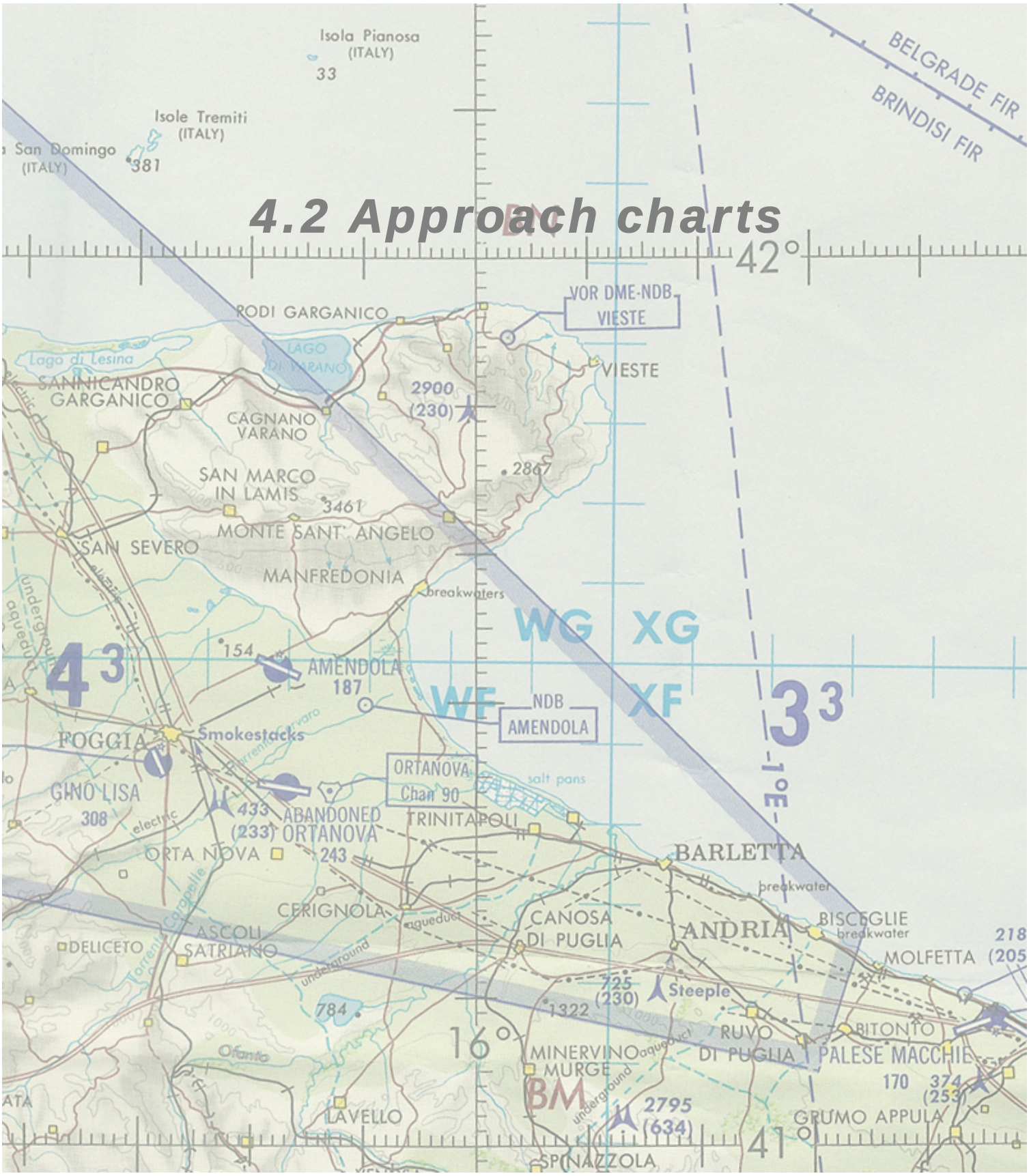
Sometime, a warning or a caution or a notice box will also be displayed on the airport charts warning the pilots of any event that may be a concern to flight safety. I admit; some of those boxes might just be eye candy and not really appropriate for the Falcon world. Still do read them, some might be important.

WARNING:
Extensive helicopter traffic all quadrants
Uncontrolled vehicules on parallel taxiways ...
and sometimes runway - use extra caution!

The airbases in F4 are quite always the same because they share the same template according to their runway orientation. There are actually **27** different layouts some of which are not used at all. That is the reason why the F4 airport can't be modelled at this time according to their real world counterpart. Only Seoul, Sunan, Osan and Kimpo have a unique layout in Korea and are modelled close to the reality. All the others are generic airbases categorized according to their runway headings. A 03/21 airbase will always be the same – the taxiway may switch side but the layout will remain identical. So it is not uncommon to see two airports almost identical.

If you are interested in airbase layout and tiles, I wrote a document quite a long time ago about that. It can be found by following this hyperlink:
http://www.candyparty.com/ST/SP/Airbase_tiles.pdf

4.2 Approach charts



Let's get to the heart of the matter. The approach charts are clearly what makes these charts worthy. The purpose of the approach charts is to ensure that the pilot can land on the assigned runway whatever the meteorological conditions are. As a fighter pilot with modern systems needs to be able to hit his assigned target in bad weather, he thus needs to find his way back and land safely in the same kind of weather. Granted, bad weather is unfortunately not common in Falcon. We had a very good weather model in BMS 1.3. That was actually the spark to the charts beginning. Unfortunately, the weather model was abandoned with BMS 2.0 and today, we have no more bad weather in F4, except fog in F4AF. Anyway since we lost the weather, I remained confident it would come back at a certain time, so I continued working on the approach charts.

Once the weather goes bad, the pilot transitions to IFR which stands for Instrument Flight Rules as opposed to VFR (Visual Flight Rules). As the names imply, VFR is flown with the head outside of the cockpit looking for visual landmarks and IFR is flown with the head inside the cockpit, looking at the flight instruments and navigation charts.

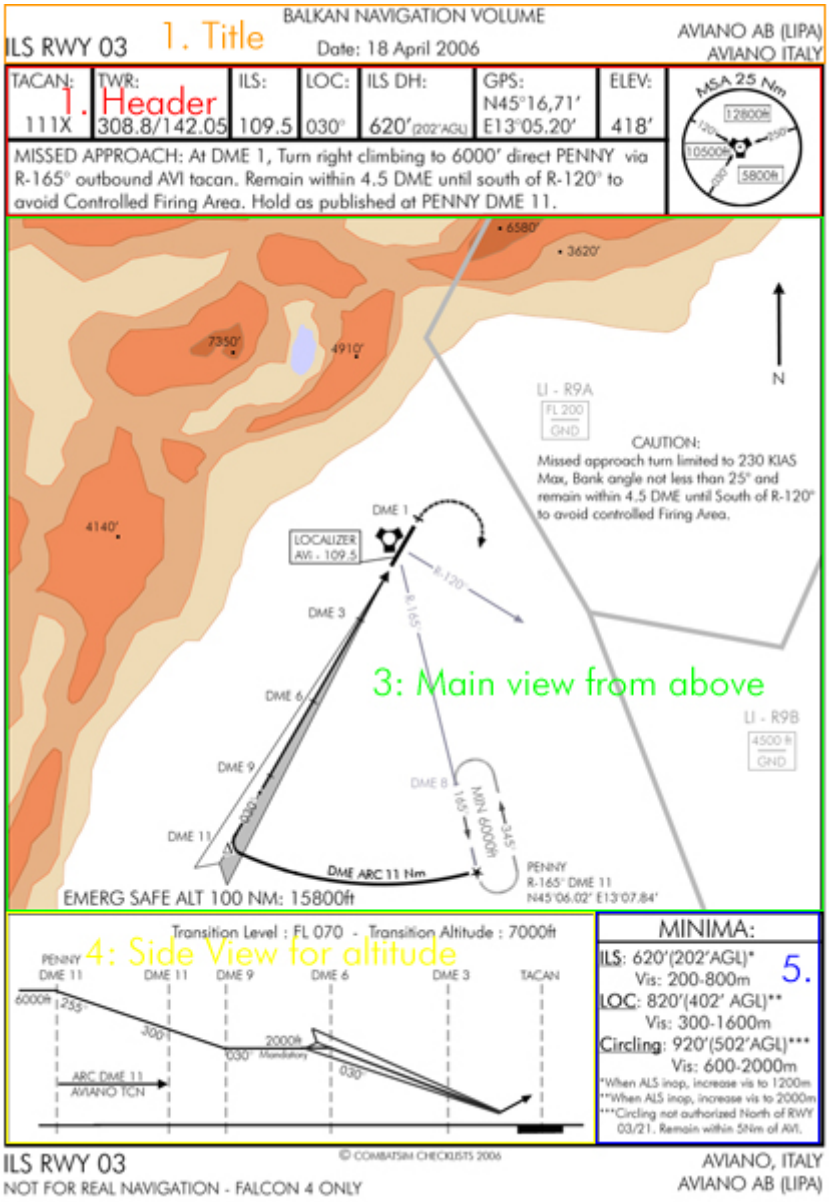
Each approach plate is subdivided in five different zones – as pictured on the following page:

1. Titles (orange)
2. Header (red)
3. Main View (or better named Plan view) which provides a god's eye view around the airport. (green)
4. Side view (or profile view) of the approach to see the altitude throughout the approach track (yellow)
5. Minima: A window giving information about the minimum altitude according to the type of approach. (blue)

In Falcon, we have four different types of approaches

- Visual where no chart is required. This is the standard overhead recovery.
- ILS (instrument Landing System) where the pilot follow the ILS steering cues.
- Tacan approaches when there's no ILS available and the approach is flown along a set tacan radial
- Circle to land approaches when for any reason the approach cannot be made on a certain runway – we use the other runway approach and then circle the airport to land to land on the correct runway.

Once again, there are many more approach types in real life such as NDB, VOR approaches, GPS approaches, radar controlled approaches, … But the charts mainly cover the four type mentioned above.



The above picture illustrates the five different zones of the approach chart for the RWY 03 ILS approach on Aviano – Italy.

Let's see each section in detail but bear in mind that as the pilot, you will need to read all of them at the same time, according to the position of your aircraft on the approach.

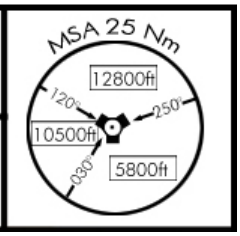
4.2.1. Titles

ILS RWY 03	BALKAN NAVIGATION VOLUME Date: 18 April 2006	AVIANO AB (LIPA) AVIANO ITALY

ILS RWY 03 NOT FOR REAL NAVIGATION - FALCON 4 ONLY	© COMBATSIM CHECKLISTS 2006	AVIANO, ITALY AVIANO AB (LIPA)

The titles actually are made of the top and bottom section.
The first indication is for which navigation volume the chart is made for. Here Balkan, but most are made for Korea. Then it clearly states the type of approach, (here an ILS), the runway the approach refers to (here rwy 03) and the name of the airbase: Aviano AB which is in Italy. The second Aviano actually state the city because sometime the name of the airport might be different than the city close-by.
The date is simply the date at which the chart was completed and besides eventually telling you it's the latest one (because no more recent chart is available through my website) it is not important.

4.2.2. Header:

TACAN:	TWR:	ILS:	LOC:	ILS DH:	GPS:	ELEV:	
111X	308.8/142.05	109.5	030°	620′ (202′AGL)	N45°16,71′ E13°05.20′	418′	
MISSED APPROACH: At DME 1, Turn right climbing to 6000′ direct PENNY via R-165° outbound AVI tacan. Remain within 4.5 DME until south of R-120° to avoid Controlled Firing Area. Hold as published at PENNY DME 11.							

The header section gives the pilot plenty of information relevant to the airbase and approach. The headers are always similar, even for a different approach types. Of course tacan approaches won't mention the ILS, but the Tacan radial and the Tacan DH instead.

The top left section gives the airbase Tacan channel and band. Although this information is not really useful when shooting an ILS approach, it is nevertheless required because most of the navigating before intercepting the ILS will be made using the tacan as the main radionavigation station.

The second section states the airbase tower frequency both in UHF and VHF. Now we don't use that in F4 for the time being. Should we have active UHF and VHF radios, those frequencies would then be inputted in the UFC with the ICP on the relevant COM pages. Failure to do so would prevent the pilot to communicate properly with the airbase ATC drinking beers in the tower. Unfortunately, in most version of F4, we don't need to switch radio frequencies so the tower frequencies are mainly eye candy. They are accurate though … well for most of them anyway. [edit: only OF supports a realistic radio behaviour)

The third section gives the ILS frequency. For the ILS cues to be displayed the aircraft instrument needs to receive the radio emissions of the ILS. Once again, unfortunately

this is automatic in most version of F4 and is tied with the tacan channels. So if you tune in the correct tacan channel, the system knows which ILS you're going to use. This is highly unrealistic as one airbase may have lots of runways with lots of different ILS frequencies. Sometime, reciprocal runways might share the same ILS frequency but usually different runways each have their own ILS frequency. But currently in Falcon, the ILS displayed is the one of the stations.dat file.
Another consequence of this way of coding the simulator is that we cannot really force the pilots NOT to use ILS when there's no ILS in real life. For instance on Aviano, the approach from the East is not possible because of a live firing range. Unfortunately, Falcon displays ILS steering cues for runway 21 which will probably put the pilot at risk of taking and artillery shell through his wings during the approach!
Whatever might you say, there's no such thing as a live firing range in Falcon. And I'd say yes, you're right! But it was a simple example. Some ILS track will make you smash in the side of a mountain as well, for the same reason … And that would spoil your mission wouldn't it ☺?
So basically, I decided to make a chart for an ILS approach whenever there's one in reality. If there's no ILS on an airbase for whatever reason, there will not be an ILS chart, but a tacan approach chart.
The correct way to have the ILS work is implemented in OF. It is untied from the tacan station and the ILS frequency can be manually set from the T-ILS page of the ICP. In this case, 109500 would need to be punched in the same way we would input the tacan channel in the system (as explained on page 9 of this tutorial) Being more than 3 figures, the system will know that the pilot is punching a radio frequency, and being the T-ILS page, the system would know that frequency is for the ILS.
This way would ensure that when there's no ILS – there would be no steering cues and the ILS flags would remain red tagged.

The following box gives the ILS DH which stands for ILS Decision Height. It's actually an error of mine; the section should say ILS D**A** for ILS Decision Altitude.
Indeed, when we talk about height (H) we mean above ground level, while we talk about altitude (A) we mean above mean sea level (MSL) I will correct this as soon as possible.
The value is given in feet MSL (here 620' where ' means feet) which is the altitude above seal level where the pilot should have the runway in sight to be allowed to continue the approach. If the runway is not visible, the pilot needs to go around and start the approach all over again. We the say the runway is below minimum. The smaller numbers (202'AGL) is the real D**H** because it's given above ground level.
Notice that the indicated altitude given by your altimeter in the F-16 cockpit gives you the altitude MSL – We can't set the altimeter according to the local altimeter setting in our sim.
We will talk back later about the minima when covering this section later on.

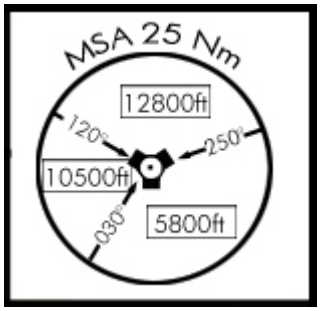
The next box is the GPS coordinates of the airbase. Due to some projection problem in the way F4 was originally coded, these GPS coordinates don't correspond to the real world. No big deal since the one given on the charts are the ones used to navigate to the airbase by punching them into the STPT page of the UFC. Please note that OF requires to add a zero in the last position as it needs three decimal.

The ELEV box gives the elevation in feet of the airport above mean sea level. Aviano stands at 418 feet above see level. It means that sitting on the ground, the altimeter should read 418 feet. That information is quite important for landing but unfortunately, it varies according to the flavour of Falcon you're flying …

The long window is the Missed approach procedure. In case of a go around, the pilot needs to follow this route back to the IAF (Initial Approach Fix) unless otherwise

instructed by ATC, which of course in Falcon never happens. A pilot may decide to go around at any moment along the approach but he has to go around if he has not the runway in sight at the minimum altitude. When going around, the pilot declares missed approach on the radio frequency and start flying the correct route – The ATC expects no less from you.

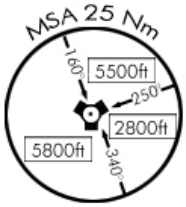
The final section is the large square on the right with the big circle in it. It's the MSA information: Minimum Safe Altitude. It gives a topside view of a circle of fixed radius centred on the relevant tacan with safe altitude (MSL) according to quadrants limited by arrival headings. On this example, pilots should notice that the minimal safe altitude between arrival headings of 250° and 030° is 5800 feet MSL. The minimum safe altitude between arrival heading of 030° and 120° is 10500ft MSL and the last sector between arrival heading of 120° and 250° is 12800ft MSL. Basically, it means that we have high terrain at least 11000 ft on the northern sector and high terrain at least 9000ft high on the western sector.



Pilots should stay at or above MSA when arriving to an airbase unless they are on approach track which will go lower while remaining safe because clear of known obstructions. In the Falcon charts, the radius of the circle will always be 25 Nautical miles. Those figures are checked in the 3D world and once again are relevant to BazT. Since it's the highest setting we have in Falcon as well as the one closest to real elevation figures in Korea, you can use these even when flying another version of F4 since the elevation figure will be lower anyway. An empty circle with only the tacan in the centre and only one altitude means that the MSA is valid all around the airbase for the fixed radius.

Tacan aproaches charts have a different header since some information such as ILS are not required.

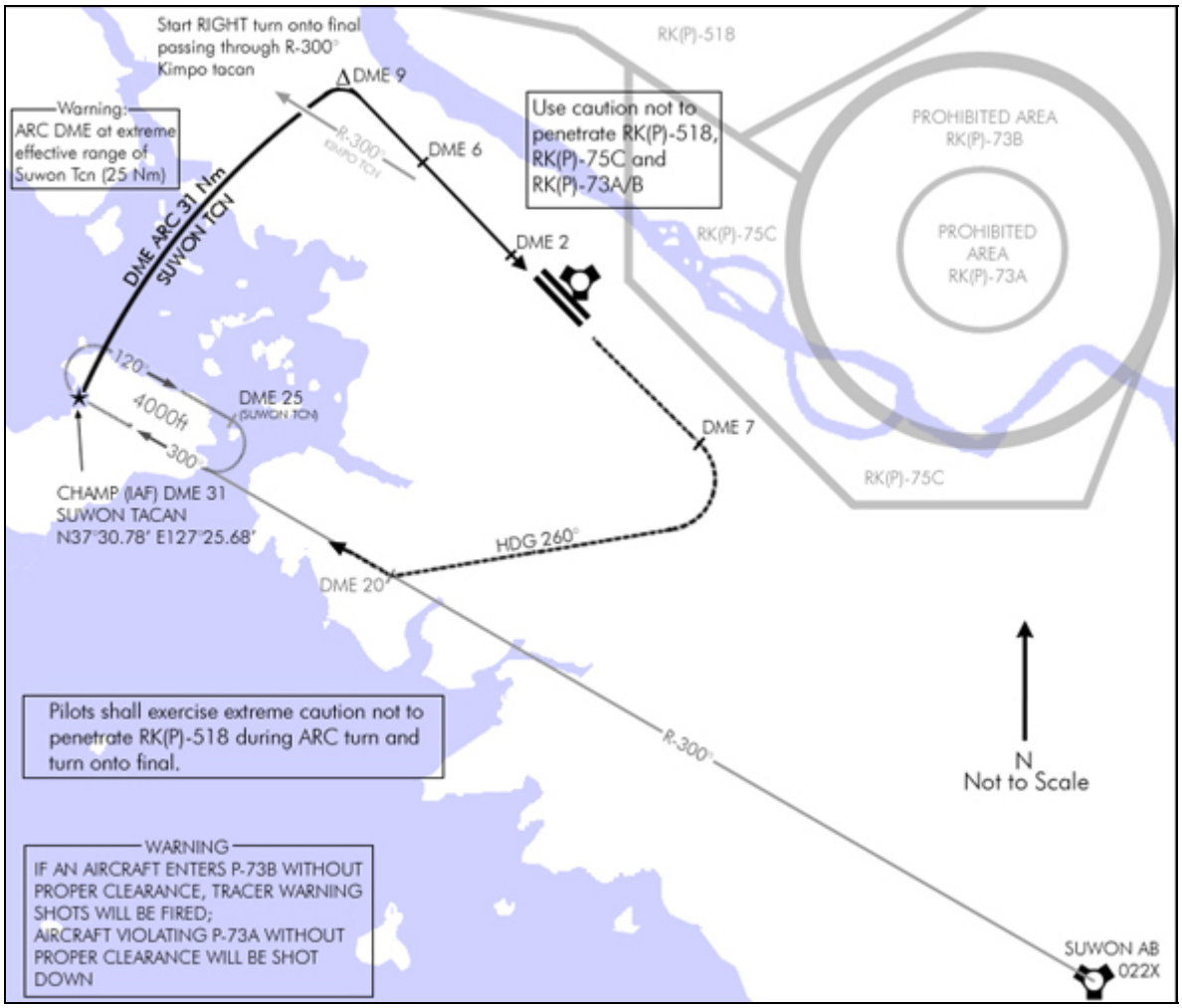
TACAN:	TWR:	TACAN RAD:	TACAN DA(H)	GPS:	ELEV:	
054X	250.2/118.2	130° (hdg310°)	560′(400′AGL)	N41°07,44′ E16°47.02′	160′	
MISSED APPROACH: Climb on RWY heading to DME2. Then LEFT climbing turn to FL10 direct LEMON. Hold as published at LEMON DME 17.						



The ILS section is replaced by the TACAN RAD giving the radial along which the approach is flown. Note that the corresponding heading is given as well. The ILS DA(H) is obviously replaced by the Tacan DA(H) giving the corresponding minimum altitude (height) for this tacan approach.

4.2.3. Plan view.

The main view is also called the airport plan view and illustrates the airport and its surroundings with the approach track when viewed from topside. A lot of information is given to the pilot on this view.
The most obvious one is the approach track pictured in black and finishing with an arrow pointing at the airbase. That track always starts at the IAF (Initial Approach Fix) pictured by a star symbol.
You also see the runway, correctly oriented and the tacan – properly placed from the runway.
The missed approach track is always pictured as a black discontinued line finishing by an arrow.
Relevant radial are dark grey as well as holding tracks and restricted or prohibited no fly zone are in light grey.
In various shades of brown you will find the elevated terrain, the darker brown the most elevated the terrain is. Summits are pictured by a black dot with the elevation in feet MSL. And finally the water is pictured in light blue. You will also find different caution and notice boxes warning the pilot of dangerous items relevant to the approach. And of course the mandatory North pointing arrow will be always displayed with the mention: Not to scale where appropriate.



Before seeing how to follow the approach track, let's talk a little bit about the restricted and prohibited area and maybe some more information about the elevated terrain.

Airspace is always categorized in different zones. For instance, we have class B, C and D airspace around airport in the US (TMA zone in old Europe) – class A airspace above the transition level for jet routes, Class E airspace below the transition level for the Victor airways and finally the class G airspace which is usually closer to the ground for VFR flight.
Amongst all that, and more important to us Falcon flyer (because we don't really care about jet routes and victor airways do we?) we can find prohibited areas, restricted areas and Military Operations Areas. The three concerns us greatly in Falcon – because most often they are military area and although we do explain here a lot of civilian IFR, we after all are flying a military airplane.

Prohibited areas are no fly zones, even for military airplane. They are put in place to protect national interest items such as a city, a presidential palace or a secret airbase for instance. They usually are named with a P. RK(P)-73B as in the example above. RK stands for Republic of Korea. (P) means Prohibited and 73B is the number assigned to that prohibited area. Some prohibited area may be so sensible that you may be fired upon if you enter it, as it is the case here with RK(P)-73A since that airspace is protecting a very high national asset.

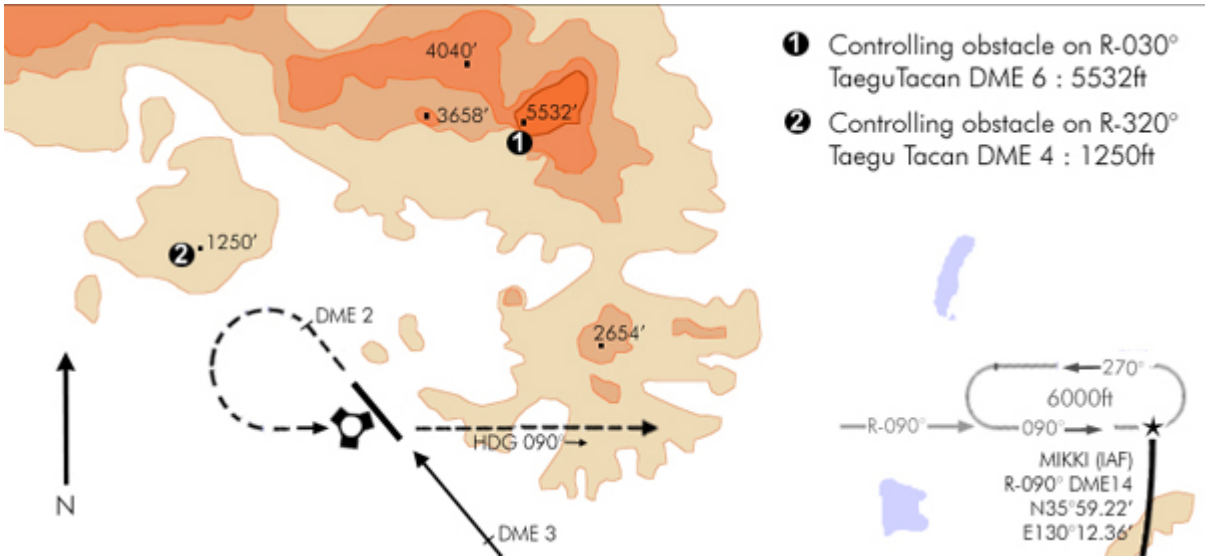
Restricted areas are zones where flight operations are subject to certain limitations. You need to be cleared by ATC before being allowed to enter such an area. They may be a firing range or a zone where safety of flight is not assured continuously. They are labelled R such as RK(R)-14 near Kwangju.

MOA are military training areas where you and I go hone our dogfight or mud moving skills, we at least in the Falcon terrain! So we can go there without really bothering. Just be on the lookout for other shit hot pilot trying some new trick on you.

All of those airspaces might be limited in altitude. That information is stated on the charts. The lack of altitude box means that the airspace is unlimited from ground to as high as you can go. But if there is a box such as illustrated on the left, it means the airspace is limited from ground to FL200. (FL stands for Flight level, that notion will be explained later but basically is an altitude given in hundreths of feet: FL200 = 20000ft) So if you are on FL 250, you can overfly it without any restrictions.

Another item of interest as far as airspaces are concerned are the ADIZ or Air Defence Identification zones. Those are buffer zones where any aircraft coming in from abroad needs to be properly identified before being granted access. Once again, this has no interest in Falcon, but it's somehow nice to play the game, especially when coming back from Indian country or even when crossing from Japan to South Korea. Bear in mind that air defences may make mistakes and shoot at you if they haven't identified your flight correctly. To avoid that comply with proper procedures for ADIZ and FIR crossing.

The charts also display the elevated terrain in different shades of brown and water obviously in blue.



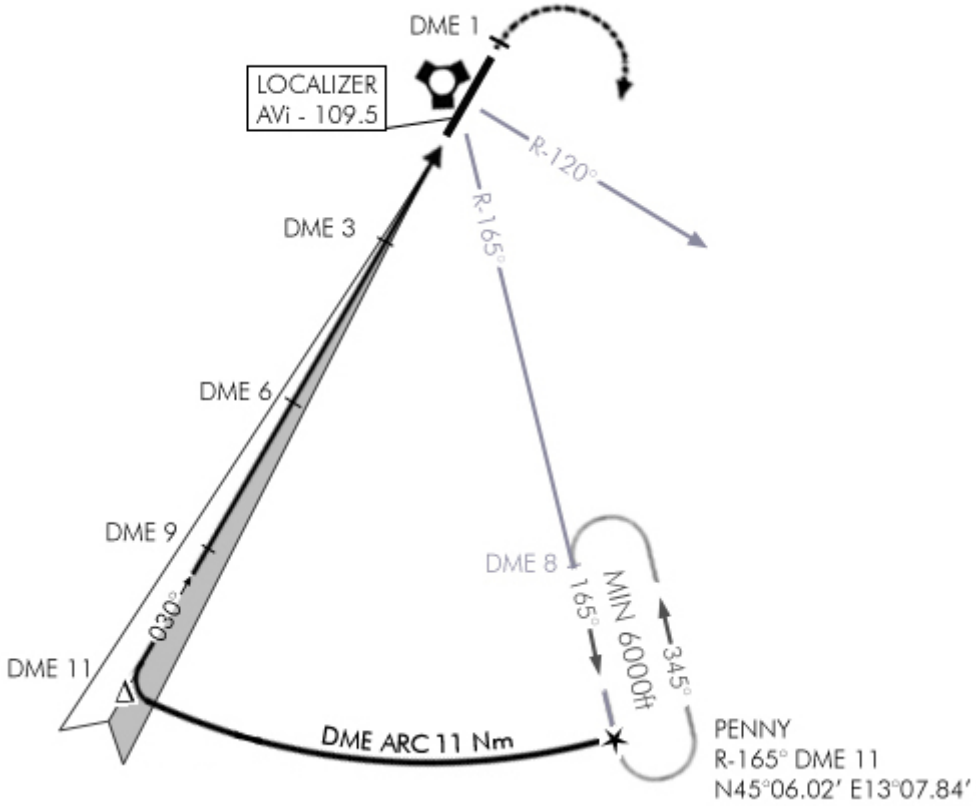
White area pictures terrain up to 999 feet. The lighter brown pictures elevations between 1000 and 1999 feet. The next shade between 2000 and 2999, and so on. The darker the shade, the higher the terrain.

The contour of the terrain and water might not be 100 percent representative of the F4 world. They are for the most of them based on real charts. But doing this I realized the elevated terrain in F4 with BazT installed was indeed very close to the real world. ☺

Highest summits are also displayed as a black dot with their respective altitude in feet next to it. Once again, those numbers represent the BazT elevator terrain for Korea. But if you didn't install BazT, your elevations will be lower and keeping the highest terrain in mind will keep you safe.

Dangerous terrain is also mentioned on the charts by numbered black circles. Usually a radial and a distance from a known tacan are given so you know exactly where the peak is.

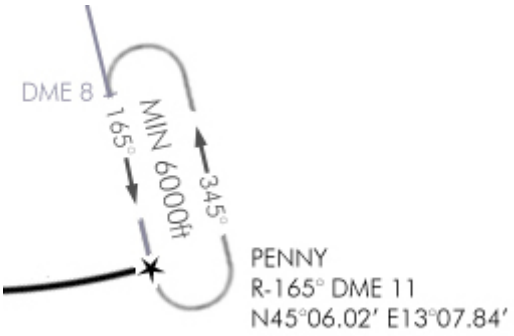
Let's get back to the approach track:
Here's an example for the ILS approach on Rwy 03 of Aviano, Italy, Balkans.



The approach track always starts at the IAF which stands for Initial Approach Fix and marked with a star on the chart. It is named as a fix, usually with a 5 letters name (here PENNY). Its position is given both in GPS coordinates and with a radial from a known tacan and the distance from the station (DME).
R-165° DME 11 means that Penny is on the 165° radial at a distance of 11 Nautical Miles. To get there, the pilot has two choices, the first would be to intercept R-165° and get to DME11, by flying INBOUND the station if the intercept is done further than 11 DME or by flying OUTBOUND if the intercept is done before 11 DME.
The second possibility, and by far the most used when returning from a mission would be to take the last waypoint of the flight plan before landing and change its coordinates so it is set at the IAF. That is quite easily done with the INS system of the aircraft computers. Then all the pilot has to do is to fly to the IAF as he would do for a simple steerpoint by selecting the STPT page (ICP #4) and select the waypoint to be changed by placing the asterisks over its number, then dobber down to the latitude and enter the new Latitude coordinates followed by the enter key and repeat the process for the Longitude coordinates.

This change of coordinates can be done automatically by using Colibri's excellent Pre-Flight Planner program to move the steerpoint to the IAF.
The altitude at the IAF is the minimum altitude of the holding pattern. You may deconflict altitudes by holding higher but try to leave the IAF with the correct altitude.

Usually, there will be a fixed holding pattern on the IAF. That racetrack pattern in grey in the chart allows a pilot to hold while the airport is busy launching or recovering other aircraft. Leader may also need that holding time to regroup their flight before impressing the brass, landing all together. Usually there's only one aircraft per thousands of feet, but I guess that a leader might fly the holding with a wingman glued to his wing. If more than two aircraft are in the flight, it might be best to send the element a thousand feet higher, which of course is only possible flying with other human pilots.



As you know, the Falcon ATC will not stack you in the holding; it will thus be the leader responsibility to deconflict the airplanes holding. It becomes tricky when more than a flight are using the pattern at the same time – but it doesn't happen often in multiplayer and even then, the leads may talk to each other to ensure flight safety.
As a rule of thumb, the first to get there should take the lowest altitude and other elements should stack by thousands feet increments.

You don't have to fly the holding necessarily when flying the approach. If there's no need to regroup or if the airport is not so busy, you can simply proceed on the approach without holding.

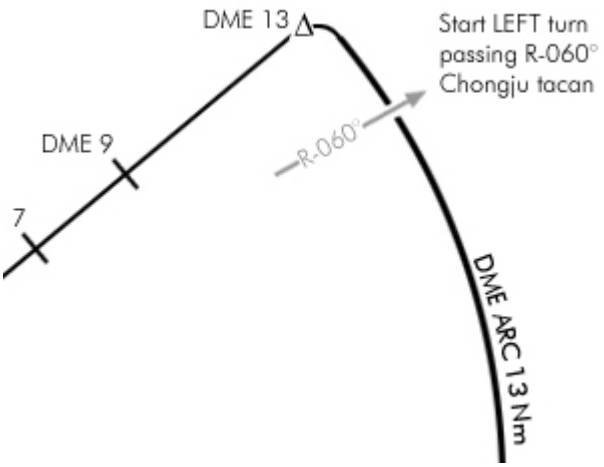
See the advanced radio-navigation section to see how to enter and fly a holding pattern. It's not easy and a lot of practise will be required before you can fly it precisely. Bear in mind that holding areas may be quite filled with airplane at different altitudes, so fly it safe by remaining on track and assigned altitude. Speed control is also an important aspect of holding. Obviously you will want to conserve fuel and since you already are quite low, it is even more important. On the other hand, flying fast will give you less time to make a perfect holding pattern and the turn will also be wider. So pilots should try to fly at a comfortable speed. Unless otherwise noted, the airspeed is at the pilot discretion. In some airspace, airspeed below ten thousands feet needs to be lower than 250 KIAS. I honestly don't know if that rule applies to military fast jets? Personally, I try to fly at maximum 300 KIAS throughout the approach until established on the glide where I adjust my speed to fly the correct AOA.

Solo fliers should contact the AI ATC when leaving the IAF. If the wind is correct, there is a good chance the active runway will be the same as the one you're landing on, since the AI ATC will vector you towards the ILS, the headings calls should be quite close to the headings given by the charts. Just ignore those stupid 2000 feet calls; you don't need to be so low as long as you haven't intercepted the ILS.
When there's a human controller in the game, just bypass the AI ATC and wait for the controller to clears you on the approach before leaving the IAF. Usually such calls should be given in the following way:
Controller: "Sting flight, Aviano approach – cleared for ILS 03 approach, report established"
Pilot: "Aviano approach, Sting flight – cleared ILS03 approach, will report established"
Once again, making the approach is usually done single plane and in this case, Sting 1 should leave Sting 2 alone for another holding turn. Still, we do like to fly the approach in flight of two, landing together it much more fun, but I highly doubt it is realistic ☺ But F4 is a game after all! When we do that, only the leader follows the procedures, the wingman just glue his wing to the leader. The lead just has to think about landing on the side of the runway to leave enough room for his wingman.

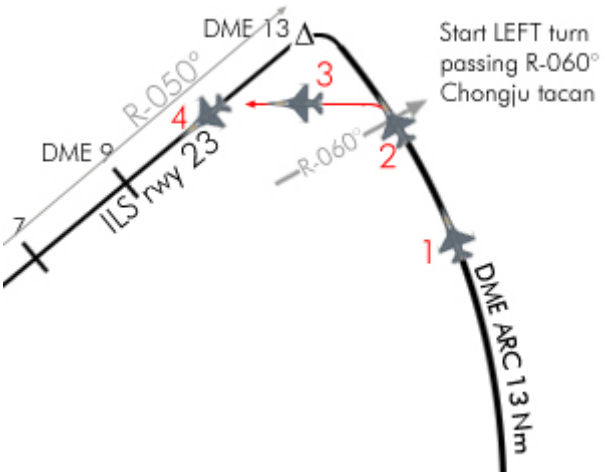
Most often, the transition between the IAF and the line up is made by an ARC DME. Performing these might seems pretty complicated but with the HSI, it's actually pretty easy. The idea is to remain at the same distance from the station by flying a fixed arc around it. It means you can turn in increments of do a very gentle turn around the stations by lowering the wing pointing towards the station. Correct procedure for flying an ARC DME is explained in the advanced radio-navigation section.
Bear in mind that leaving the holding pattern, you will need to turn usually 90° which takes time and might push you out of the required distance. Try to lead a little your exit so you remain spot on the correct DME.
While flying the arc you will also need to descend to a lower altitude. It adds another aspect to keep in check and you will need not only to check the HSI to fly the arc but continue your scanning so your speed, attitude and altitude remain within limits… which are rather small wouldn't you say?

The same lead will be required when leaving the DME ARC to line up on the approach track. You usually have plenty of time to line up properly before intercepting the glidepath, but the sooner you're on the correct track, the better. Remember that one, because it's really the key to a correct approach. The sooner you have the proper attitude and speed, the easier the approach will be.

Usually, I would start the line up turn passing the approach radial minus (or plus) 10°. From there, the line up turn doesn't have to be a perfect curve. It can be a hard turn to get a 30° interception on the line-up radial and then intercept it smoothly. Let's take an example.



You will land on ILS Rwy 23R of Chongju airport. You just passed NOSONG IAF and are flying the DME ARC 13 NM, descending to 3800ft. You know you will need to turn left to intercept the ILS. The ILS will also be near the 050° radial of Chongju tacan – although just before since the tacan is offset to the north of the runway.
Your HSI has been set to TCN/ILS mode so you get both tacan and ILS information. The tacan 042X as well as the ILS have been set in the UFC. All you would need is to have a reference point to start your lining up turn on the ILS. That point is given by the intersection of the DME ARC and the 060° radial. And to visualize that point with the HSI, you just need to set the course arrow on the 060° radial. At the beginning of the DME ARC, the CDI will be on the side and as you near the radial, the CDI will centre. When it is centred, you're passing through the radial and you can start a left turn to 270° to have a 40° attack angle on the ILS which is 230°. That interception heading will bring you on the ILS well before DME9. Once the localizer starts to move in the HSI, line up as you would do with the CDI but remain at the published altitude which is 2600ft for DME 9 on this approach as the chart side view tells you.



A short while after leaving NOSONG, the aircraft is slightly banking left so the red station bearing pointer remains on the 9 o'clock position – to remain at DME 13 from the station. The mode is set to Tacan and radial 060° is set in the course arrow. Note the heading which is 015° - the departure heading from Nosong was 030° (300°+90°=030°) so we already turned 15°

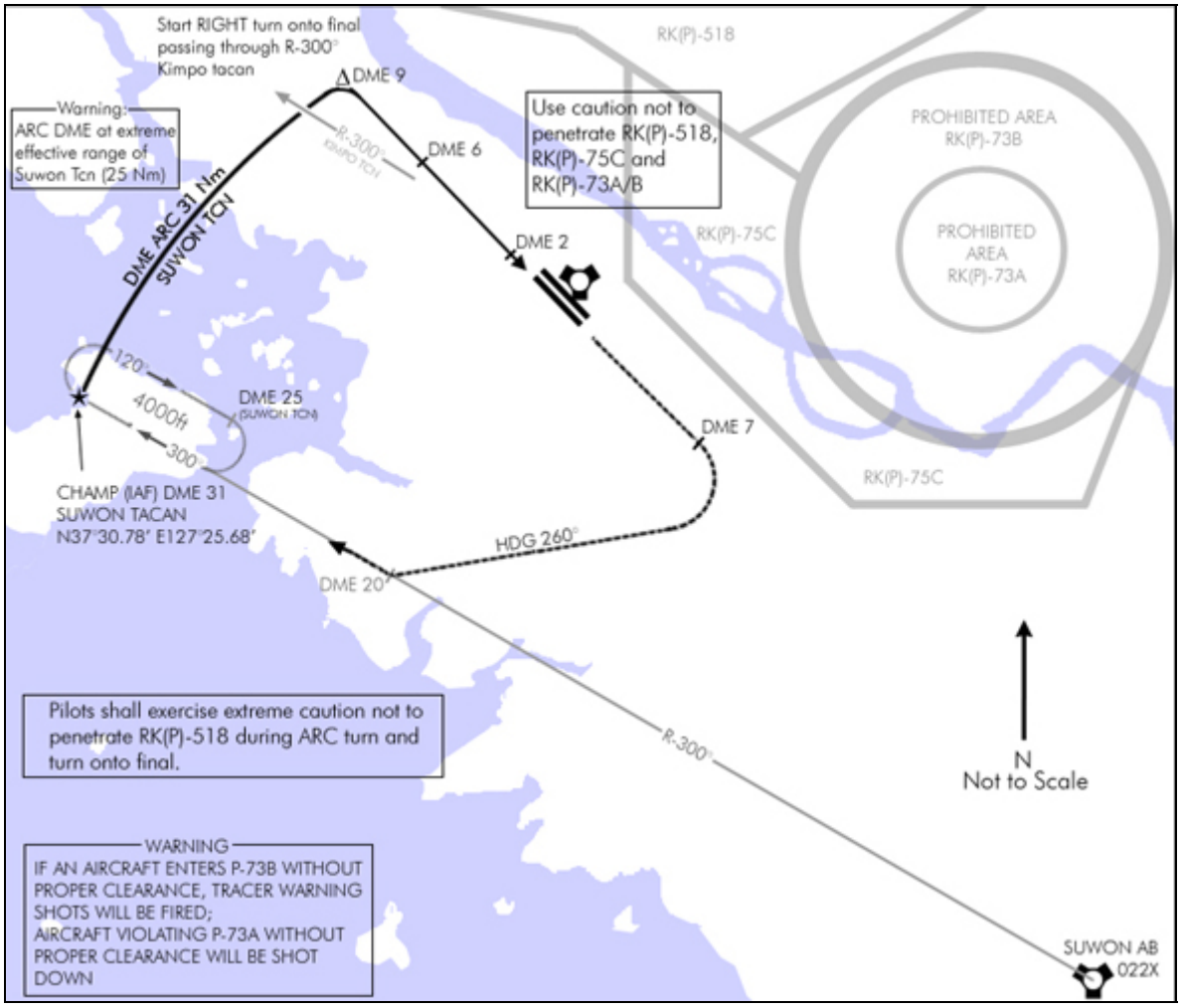
At point 1, the CDI started to centre. The station bearing pointer is still maintained on the nine o'clock position but I drifted a little toward the station since the DME is now reading 12 Nautical miles. The heading is now 330°. It's important to check the heading leaving the IAF, during the DME arc and certainly the exit DME ARC heading which here would be 230°+90°=320° if we were to continue the DME ARC to the ILS localizer. It's good practice to commit these reference headings to memory.

At point 2, the CDI is centred, it is now time to turn left to a 270° heading and switch the mode selector to TCN/ILS so the CDI displays the localizer instead of the tacan radial. This is really a step not to be missed because it induces some confusion as you will see on the next picture.

We are at position 3; although we still need to level out. Heading is 270° and the mode switch has been switched to ILS/TCN. The glideslope is displayed in the ADI (horizontal yellow bar) and it's above is which is fine. The localizer is displayed in both the ADI and HSI. (Vertical yellow bar on the ADI and CDI in the HSI.) The problem is that the CDI of the HSI is on the other side than the localizer on the ADI. It is because the course arrow is still set to 060°. Switch it to 230° (ILS track) and the CDI will be on the right as in the ADI. If you look back at position 3 on the image on the previous page, you will notice that the ILS track is indeed to the right of the small F-16 on position 3. Changing the Course arrow on the HSI is not mandatory; you can rely only on the ILS indications on the ADI. Still taking the time to set correctly the HSI may salvage your approach later on. The image on the left shows the HSI with the course arrow set correctly on the 230° radial and with the CDI a notch to the right. Indeed, while setting it up, the aircraft got closer to the ILS (we are now at DME11) It's high time we make our final left line-up turn to get properly on the localizer. Luckily, we don't have any passenger on this flight.

We are now at position 4, lined up properly with the localizer and waiting for the glidepath to come down on us. We are at DME 9 and should then be at 2800 ft as the side view of the chart instructs us. We should now start a descent of 800ft to pass DME 7 at 2000ft until glide interception.
It is thus very important to keep a good speed awareness throughout the procedure because even tough the speed will not really impact your flight path (short of giving you too little time to sort the intercepts) your approach will be spoiled at this point if the speed is too high. As you aim to be on speed AOA as soon as getting on the glideslope, you want to avoid being at point 4 showing 420 indicated airspeed. More like 200 – 220 kts before gear extension.
Once at DME 7 and 2000ft, all we have to do is wait for the glideslope to centre on the ADI and at that precise time, lower the landing gear and get on the correct speed for landing which usually is around 140 kts but depends on your weight. So concentrate on the AOA indicator. Increase speed if the red triangle is lighted, decrease speed if the yellow triangle is lighted. On speed AOA is attained when the green circle is ON.
Most glideslopes are pointing 3° down so push the stick so the flight path marker is halfway between the horizon line and the -5° reference line in the HUD and you should be fine. Remember, AOA is maintained with throttle inputs, no pitch inputs. From there you need to remain heads down on the instrument, carefully following the glideslope and localizer with minimum inputs until reaching the minimum. For this ILS approach on Chongju runway 23R, the minimum is set at 262 feet which is 110 ft above ground level. Reaching 262 feet on the altimeter, you need to look outside for the runways lights and commit to the visual final approach if you can see the runway or declare missed approach and going around if you can't see it. Don't miss the minimum – unless you want to buy the farm.
Of course, you don't really have to keep inside the cockpit for so long on a clear day - when visibility is good. Just remember to train for it because one day you might need the experience to land safely. Still looking up at the minimum and finding your aircraft perfectly aligned with the runway with the correct speed is quite an accomplishment and something you can be proud of!

In case you need to go around, the missed approach track is displayed in the main view as well. Usually it is a direct route from the runway back to the IAF but in some busy airbases, you might have to follow a specific route back to the IAF. Let's consider the example for Kimpo:



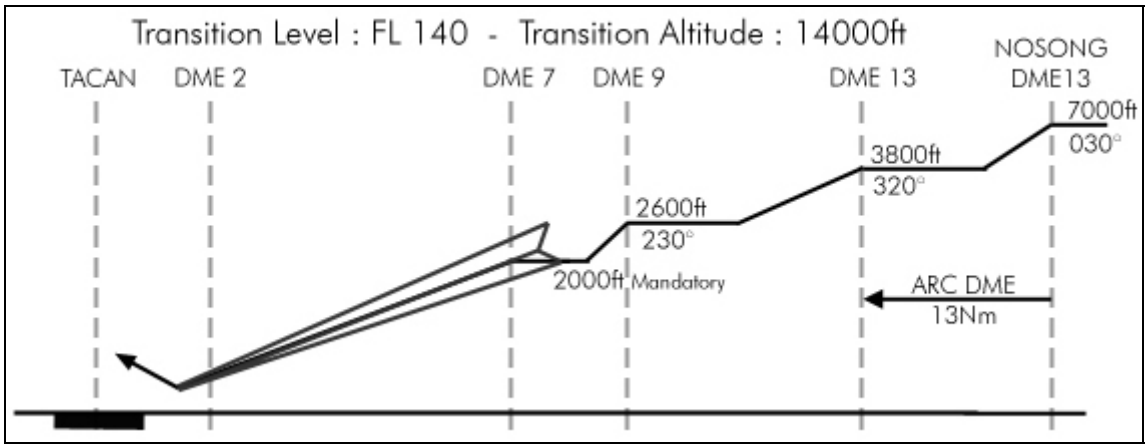
You just looked out of the cockpit; searching for the runway at DME2 but for whatever reason you can't see the runway. So you have to increase power, get a positive attitude and retract the landing gear – overflying the unseen runway. The discontinued line on the chart gives you a gods' eye view of the missed approach track and the text explaining the procedure is in the header of the chart:

MISSED APPROACH: Climb straight ahead outbound via R-140° Kimpo tacan until DME 7. Then turn RIGHT 260° to intercept and proceed outbound via R-300° Suwon tacan to CHAMP fix. Hold at 4000ft.

So your first priority is to get away from the ground and get away from the busy airspace around the airport. The procedure calls for a climb straight ahead to 4000ft (which is the altitude at which you will need to be at the holding point) – using R-140° of Kimpo tacan (which should already be set) but just don't forget to toggle back the instrument mode

from TCN/ILS to TCN. As you see on the chart, there's a prohibited area just left of the missed approach track so care should be taken to avoid drifting there, especially with a southern crosswind. At DME 7, a right turn is required to heading 260°. During that leg, the tacan needs to be reset to Suwon 22X because we will need to intercept R-300° outbound from that station which should be reached at DME20. From there, you will just need to track outbound the R-300° until reaching the CHAMP IAF at DME 31 which is at extreme range of the Suwon tacan. Then you can simply fly the approach if cleared by the ATC or enter the holding pattern.

4.2.4. Side view



This view is the same as the plan view but viewed from the side which give the pilot the required altitude at specific points of the approach. Let's get back to the Chongju approach we used as an example for the DME ARC transition to the ILS.

At Nosong (IAF) the altitude reads 7000 ft which is the minimum holding altitude.
Between the two vertical grey lines at DME 13, the black arrow displays the DME ARC and its distance: 13Nm. Also of interest near the NOSONG line is the departure heading for the DME ARC: 030° (as we calculated earlier: 120°-90°=30°).
At the end of the DME ARC, the aircraft should be at 3800 ft and with an exit heading of 320°. At DME 9, altitude should be 2600 ft and heading 230° already lined up on the ILS localizer.
A descend to 2000ft is then required, maintaining alignment with the localizer until intercepting the glideslope which should happen between 6 and 7 DME.
We always intercept a glideslope from below to avoid diving to chase it. So the goal is to flight level and let the glide slowly come to you from above. Once established, pop the airbrakes, lower the landing gear, add a notch of power and pitch 3° down to follow the glide.

The altitude levels displayed on the chart are not mandatory – if you can plan your descent to be at the required altitude at each point by flying a constant descend, that's very fine… and actually easier – The levels are just there to emphasize the required altitude at specific DME points.
Between DME 7 and the runway, the 3° glideslope will bring you the minima, where the arrow pointing upwards displays the missed approach track in case you can't land.

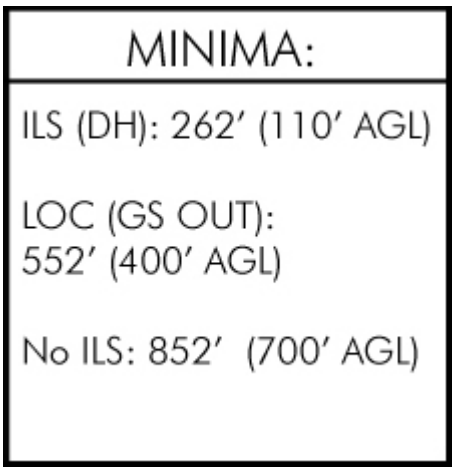
The text line on the top of the window gives the transition altitude and transition level. That imaginary line in the sky is set at a specific altitude (usually fixed for within the same country) where the altimeter setting is switched from local setting to the standard value.
Below the transition, we use local altimeter setting given by the ATC and we talk about altitude given in feet. E.g. 9000 ft. Above the transition level, the altimeter setting needs to be set to standard altitude which is 29.92 inch of mercury (Hg) in the US and 1013 mill bar (mb) in country where the metric system is used. We then mention the level in Flight levels and not in feet anymore. E.g. FL210. Flight levels are given in hundreds of feet so FL210 is actually 21000 feet.

Unfortunately, setting the altimeter in Falcon is not implemented so the ATC doesn't give the local altimeter setting. And the altimeter setting window in some cockpits is remaining blanks.
If it were implemented, the pilot should need to set the required altimeter setting in the altimeter by turning the knob on the left until the correct reading is displayed in the red framed window: The unit is mill bar in the MLU European F-16 and Inch of HG in US blocks F-16.

For the charts, I decided to mention the transition altitude to use the correct way to give altitude calls. So above the transition, speak in Flight Level, below the transition, speak in feet.

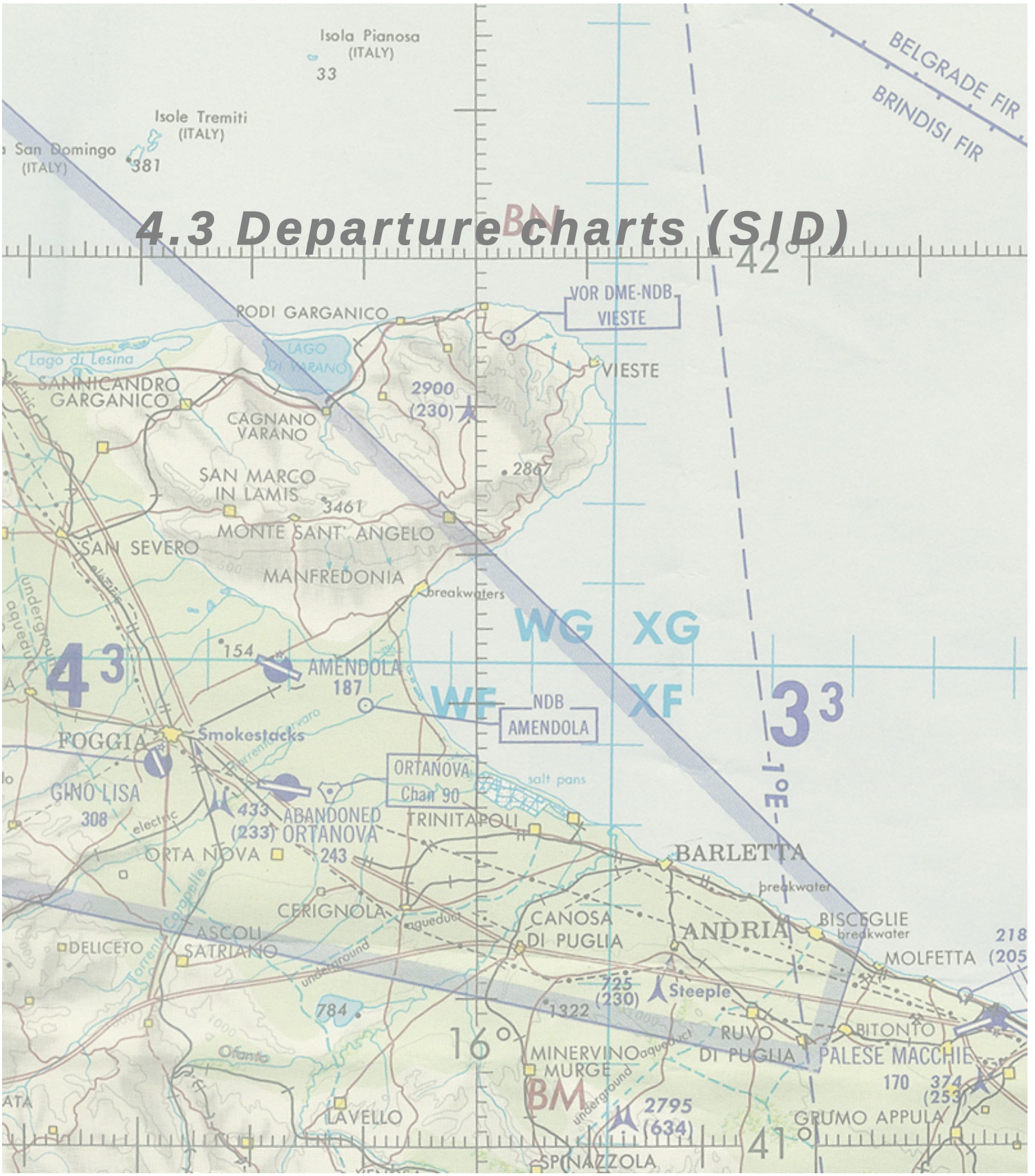
The transition altitude in Korea is 14000feet. The transition level is FL 140.
In the Balkan, the transition altitude is 7000ft; the transition level is FL 070.

4.2.5. Minimum



The minima window just gives the minimum altitude of the approach. When you reach that altitude you should look up outside and have a visual on the runway to be allowed to continue the approach. There are usually 3 minima for an ILS approach:
The first one is the minimum when the ILS is fully working: 262 feet MSL which is 110 ft AGL.
The second one is when you perform an approach based on the localizer only (no glideslope information) It is obviously never the case in Falcon. And finally, the No ILS is when the ILS is inoperative or in case of circle to land that has been explained in the advanced radio-navigation section.

The minima for the Balkan are more complete and induce a notion of visibility that needs to be met as well for the approach to be completed. Plus some eyecandy about the ALS (which basically are the runway lights) in case they are inoperative but that never happens in Falcon.
Some supplementary information might be given there as well. In this case, circling is not authorized north of Rwy 03/21 and aircraft should remain within 5 DME in case of circling the airport because of the restricted area (firing range) east of the airport.


Isola Pianosa
(ITALY)
33
Isole Tremiti
(ITALY)
San Domingo
(ITALY)
381
BELGRADE FIR
BRINDISI FIR
4.3 Departure charts (SID)
BM
42°
VOR DME-NDB
VIESTE
RODI GARGANICO
Lago di Lesina
LAGO DI VARANO
VIESTE
SANNICANDRO GARGANICO
2900
(230)
CAGNANO VARANO
2867
SAN MARCO IN LAMIS
3461
MONTE SANT' ANGELO
SAN SEVERO
MANFREDONIA
breakwaters
WG
XG
WF
XF
43
33
154
AMENDOLA
187
NDB
AMENDOLA
FOGGIA
Smokestacks
ORTANOVA
Chan 90
salt pans
GINO LISA
308
433
(233)
ABANDONED ORTANOVA
TRINITAPOLI
ORTA NOVA
243
1°E
BARLETTA
breakwater
CERIGNOLA
aqueduct
CANOSA DI PUGLIA
ANDRIA
BISCEGLIE
breakwater
DELICETO
ASCOLI SATRIANO
underground
MOLFETTA
725
(230)
Steeple
784
1322
16°
RUVO DI PUGLIA
BITONTO
MINERVINO MURGE
PALESE MACCHIE
170
374
(253)
2795
(634)
GRUMO APPULA
41°
LAVELLO
SPINAZZOLA

SID stands for Standard Instrument Departure. It's a published departure procedure from an airport. It decreases the load of communication between ATC and pilots since each know what to do to get to the exit point. In real life, its purpose is also to deconflict traffic and provide noise abatement by avoiding populated area whenever possible.
Since the F4 ATC just gives a take-off clearance, it will be the leader responsibility to decide which SID to use, according to the take-off axis. Once again, the lead may elect not to follow any procedure at all and dash towards the flot or simply follow his flight plan.
The advantage of the SID in F4 is to provide a time for the wingman to take off (and we know AI are sometimes slow getting in the air). Usually, the time required for the lead to fly the SID will make a rejoin very easily since the wingman will not need to use afterburner following their leader in a long tail chase. If the flight is not complete at the exit point, the leader may use the published holding point to wait for the rest of its flight.
In multiplayer, the SID is also great to provide a common route for member of a flight which can then be sure to rejoin easily and concentrate on flying their airplane without the stress of a complicated rejoin after departure. If all follow the same route at the same speed, then the rejoin will be natural at the exit point. Just think about deconflicting altitudes at the exit point to avoid mid air collision. The members might not get a direct visual on the other aircraft!

As you may have noticed – and quite logically – the SID don't necessarily point to the North in Korea and you may fly southbound to the exit point before starting your northbound flightplan. Some may say that it is consuming fuel and I would of course agree. But once again, according the fuel load and planning, pilots can elect to discard the SID totally.
The reason is that most of these procedures are done for peacetime and we don't want aircraft upsetting the North Korean by coming too close to their airspace. From a fighter point of view, although is increases the flight time, it may also provide a mean to penetrate North Korean airspace from a vector not direct from a known military airbase… because clever tacticians will wait for you right there!

Another consideration is the TOT (Time over target) Flying the SID will certainly push your flight out of your assigned TOT, so care should be taken to adapt the TOS (Time over steerpoint) at waypoint 2 to have plenty of time to fly the SID.
Usually, a good idea would be to place waypoint 2 on top of the SID exit point. That can be done during flight planning in a general way, and refine its placement once in the cockpit with the GPS coordinates of the exit point or do so with the PreFlight Planner from Colibri.

And finally, such departure procedures might be an easy way for AAA servants to deconflict friendly from enemy aircraft. If you're on the SID at the required altitude, you're friendly. Any other aircraft might be fired upon without warning. Sure it's not like this in F4… but with a little imagination ☺

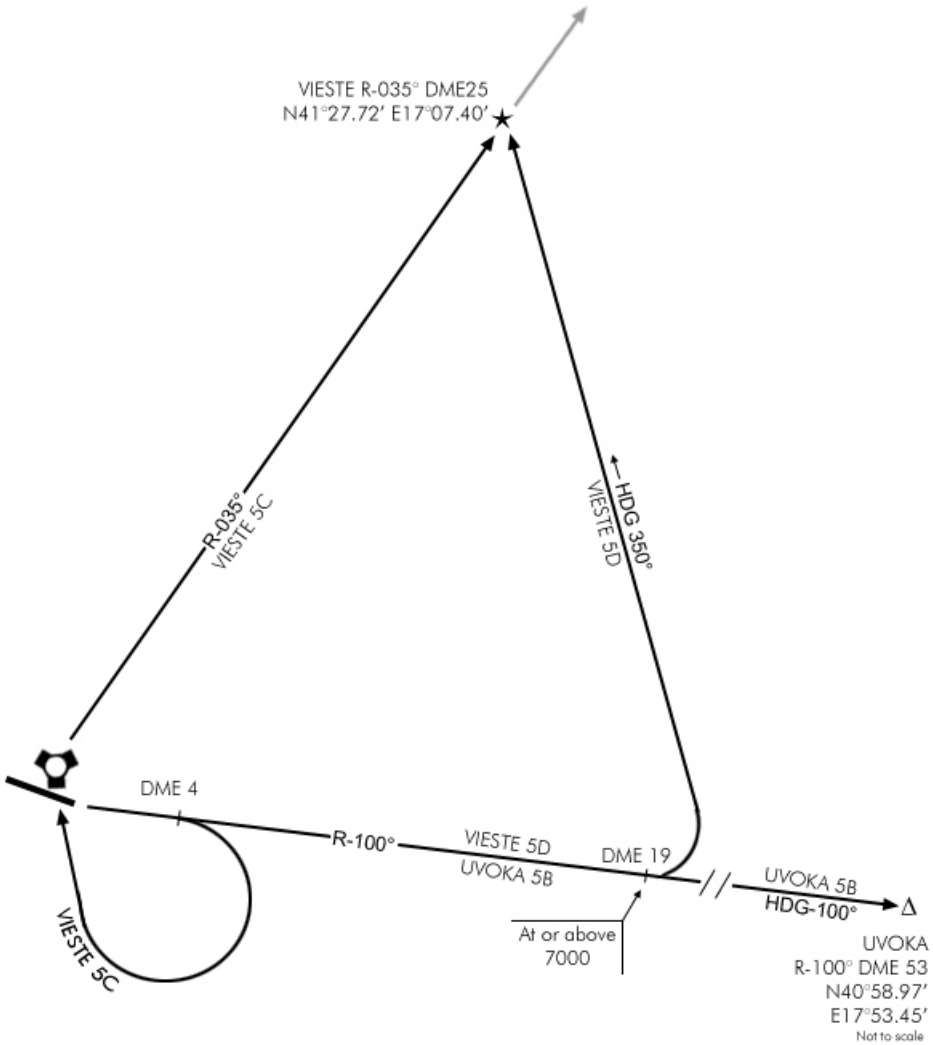
Flying such a departure procedure involves a lot of preparation in flight planning. First you need to be aware which of the runway will be likely to be active. For that you need to check the wind in the briefing. Then you should review the procedure before entering the aircraft and know what radionavigation as well as radials to set in the cockpit. If you stay behind the airplane once in the air, by checking the chart constantly to see what you need to do next, you will probably get out of the published route. Some SID are very easy to follow, other are much more complicated and involve a lot of tacan switching.

4.3.1. SID Review

As the other charts, the SID starts with a title section and a header section. Those two sections are quite similar to the ones we explained on the approach chart chapter. So I won't cover them again here. The main difference is that the missed approach has been deleted and there's no mention of ILS or Tacan for the approach and these are replaced by the Transition altitude and transition level, more important here since we are likely to use it while climbing out.

TACAN:	TWR:	TRANS ALT:	TRANS LEVEL:	GPS:	ELEV:
054X	250.2/118.2	7000ft	FL70	N41°07,44' E16°47.02'	160'

The remaining of the chart is a plan view of the departure route and a written description of the route. There is no side view for altitude. The required altitudes are mentioned on the plan view at key point along the departure.



Let's consider Amendola departure. Amendola is an 11/29 runway and there are three different routes for each runway. Two different exit points in total. One in the North, on a

direct route to the Balkans, and the other in the East.
Our first example is for the runway 11 departure. We have the choice between Vieste5C, Vieste 5B and Uvoka5B routes. As you see the Vieste routes share the same exit point obviously named VIESTE to the North. Uvoka5B route share part of the way with Vieste 5B and leads to UVOKA, the easternmost exit point.

The procedure is explained in plain text in the Departure route description. The first thing to do is to read that the section relevant to the departure you will be flying.

DEPARTURE ROUTE DESCRIPTION

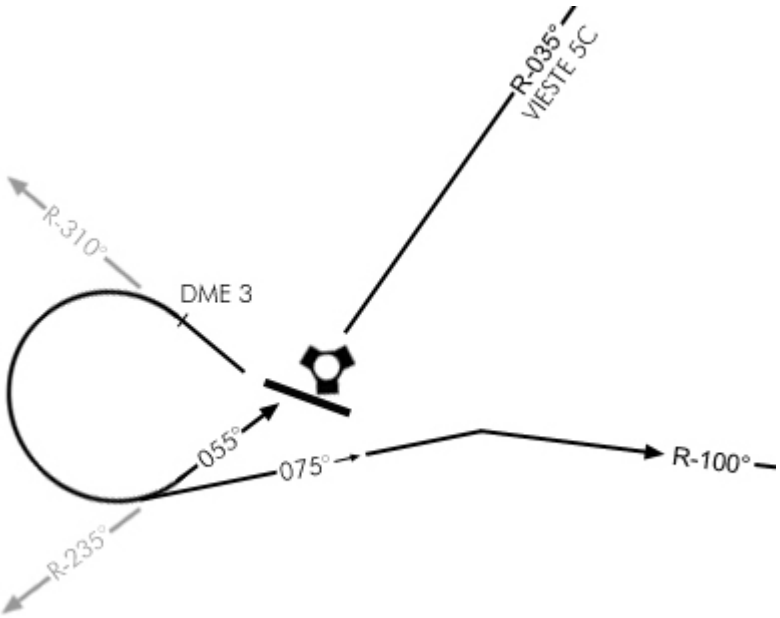
UVOKA 5B: (RWY11) Climb on R-100° outbound Amendola tacan. Proceed inbound UVOKA to be reached at assigned FL. Thence...

VIESTE 5C: (RWY 11) Climb on R-100° outbound Amendola tacan. At DME4, Turn RIGHT DIRECT to the station. Intercept R-035° outbound amendola tacan to VIESTE to be reached at assigned FL. Thence, ...

VIESTE 5D: (RWY11) Climb on R-100° outbound Amendola tacan until DME19 to be reached at or above 7000ft. At DME 19 LEFT climbing turn to heading 350° and proceed direct to VIESTE (R-170° inbound VIESTE Waypoint) to be reached at assigned FL. Thence,...

In this example, the runway 11 is active and we will fly Vieste5C. Prior to lining up, the tacan is set to 054X and the course arrow is set on the 100° radial. The instrument mode is obviously in TCN position. Check waypoint 2 coordinates and adjust them to the GPS coordinates of Vieste if necessary.
Once airborne, a climb on R-100° is required until reaching DME4. As the F-16 is accelerating and climbing fast, you should take care to get out of AB as soon as possible and don't climb like a rocket. 8° pitch up is usually more than enough, showing a speed of 300 kts indicated.
Passing 4 DME, turn right gently back direct to the station. You don't need to track a radial back to the station, simply placing the red station bearing pointer on the 12 o'clock position on the HSI will do.
Since you don't need the course arrow on the 100° radial, you can already switch it to the 035° setting so you're ready once overflying the station.
Turn right again overflying the tacan to a new heading of 035°. As we saw earlier in the basic radio-navigation section, you need to let the tacan at least 2 Nm behind you before getting on the radial. Since you turned right above the tacan to a 035° heading, there is a good chance you're very close to the radial, so once the CDI stopped moving towards the centre of the course arrow, simply make a tiny adjustment in angle to get on the radial. In the meantime, you probably reached your assigned flight level for waypoint 2 (which you set at the VIESTE GPS coordinates) level out. Finally track the 035° outbound till reaching VIESTE exit point, trying to get a visual on your wingmen joining up on you. Past Vieste, switch to your INS route and go on with your mission.

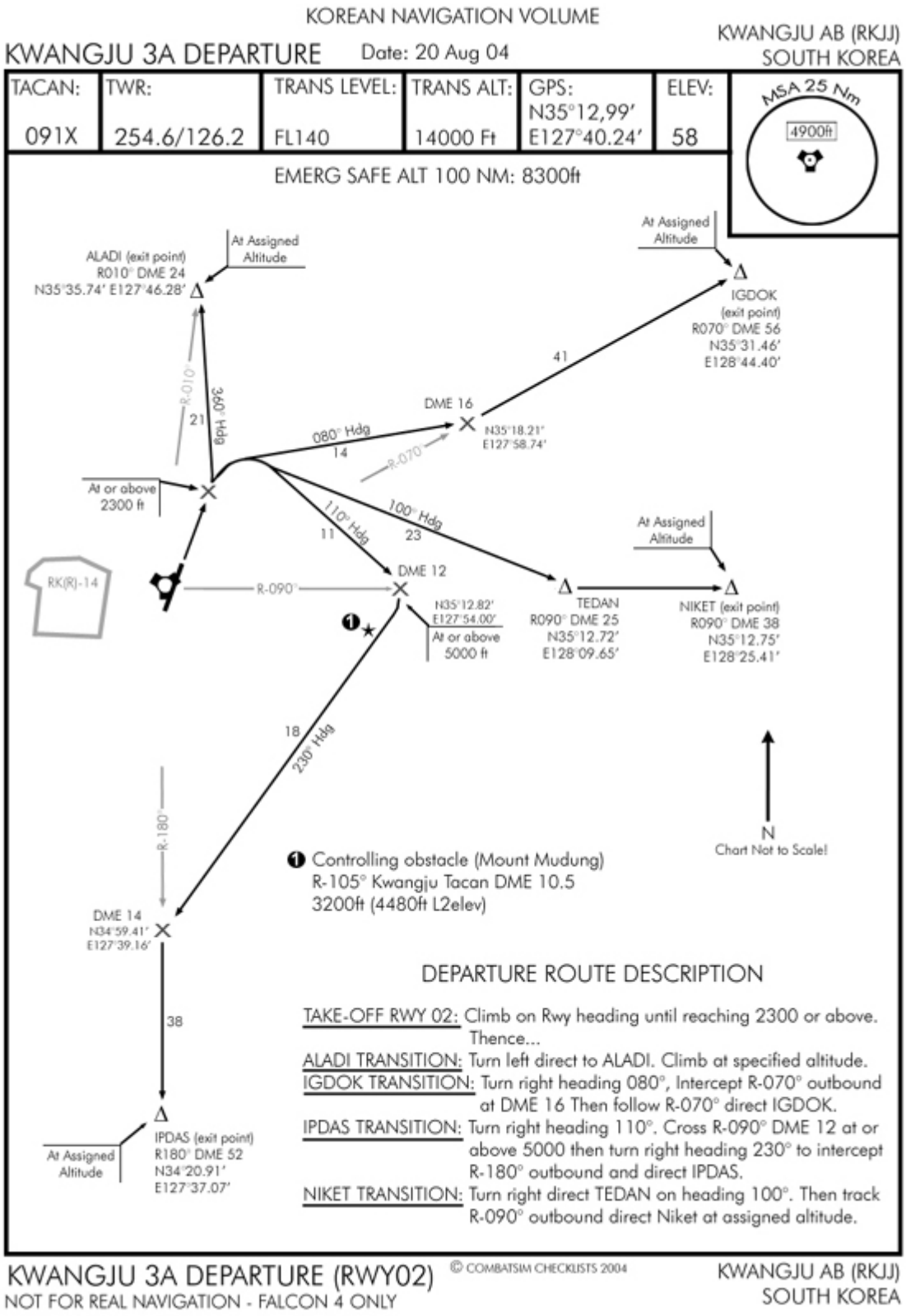
The other routes are self explanatory. And in the event runway 29 is active, the same routes apply, except the initial part of the route is slightly different.



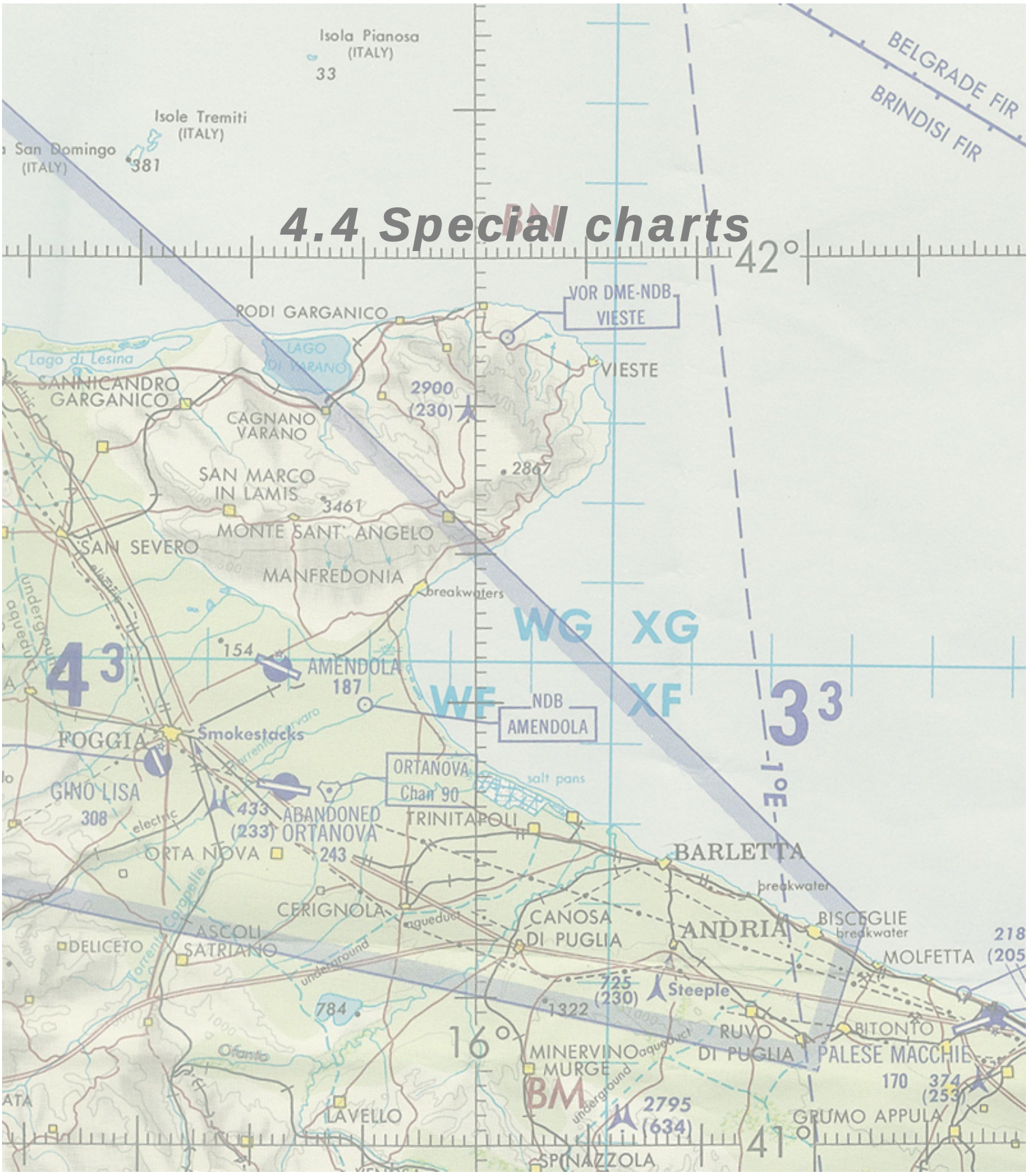
Vieste 5C will happen quickly and the pilot will be able to switch radials quickly on the HSI. Start by selecting R-310 and follow it to DME 3, then gently turn left – selecting R-235° or already R-055°. I advise the later since it will be easier to track it. Once set, observe the CDI and make sure you intercept the 235° inbound before overflying the tacan. For that you will need to make sure the station bearing pointer remains on your left while the CDI centres on the course arrow. Once it's centred, fly a heading of 055° until overflying the station where you would need to turn a further 20° to the left to fly a heading of 035°, once again setting the course arrow to 035° while overflying the tacan.
It's obvious that you can't do all this in HUD view; you will need to fly on the HSI view, keeping a constant visual scan of the other main instrument.
The Vieste 5B and Uvoka 5B are somewhat easier, just fly a heading of 75° levelling after the initial left turn and set the course arrow on the R-100° radial. Since you're pretty close from the station the intercept angle of 25° (100°-75°) will be more than enough to get on the radial soon after the bearing pointer drifted on the rear left quadrant.

Flying SID is not overly complicated as long as only one tacan is concerned. The trick is to plan the procedure properly before departure. It gets trickier when more than one tacan station are necessary to follow the route and when you have multiple transitions like on Kimpo and Kwangju. Transitions are different routes leading to different exit point of the same departure.
(See next page)
The SID itself says to climb on runway heading until reaching 2300 feet. Then the pilot has 4 transition routes at his disposal, depending on which direction his flight plan goes: ALADI to the North, IGDOK to the North East, NIKET due East and IPDAS due South.

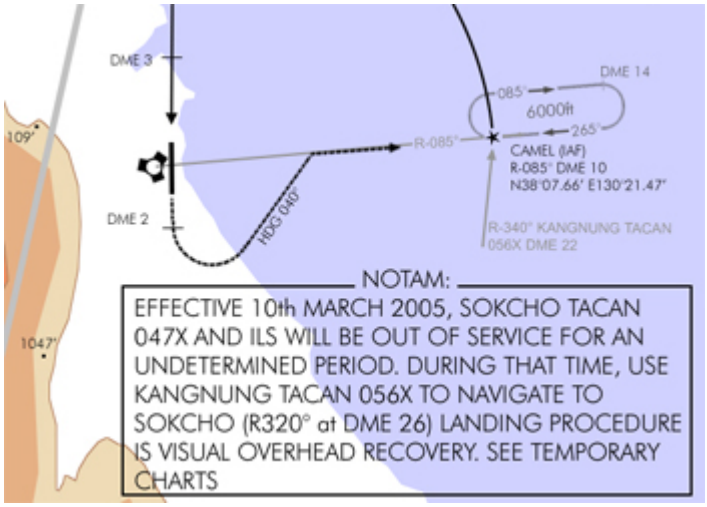
Also of interest is the black circle with a 1 inside. It gives the position of an obstacle near the route. In this case, a mountain with a highest point at 4480ft (with BazT) Since you're supposed to pass DME12 at or above 5000ft continuing your climb, you should be safe. But it does point of the importance of altitude control throughout the route. Since you're heads down in the cockpit you won't see the mountain that will spoil your mission … and reputation.


KOREAN NAVIGATION VOLUME
KWANGJU 3A DEPARTURE
Date: 20 Aug 04
KWANGJU AB (RKJJ)
SOUTH KOREA
TACAN: 091X
TWR: 254.6/126.2
TRANS LEVEL: FL140
TRANS ALT: 14000 Ft
GPS: N35°12,99' E127°40.24'
ELEV: 58
MSA 25 Nm
4900ft
EMERG SAFE ALT 100 NM: 8300ft
ALADI (exit point)
R010° DME 24
N35°35.74' E127°46.28'
At Assigned Altitude
IGDOK
(exit point)
R070° DME 56
N35°31.46'
E128°44.40'
At Assigned Altitude
DME 16
N35°18.21'
E127°58.74'
080° Hdg
14
R-070°
41
R-010°
21
360° Hdg
At or above
2300 ft
110° Hdg
11
100° Hdg
23
RK(R)-14
R-090°
DME 12
N35°12.82'
E127°54.00'
At or above
5000 ft
TEDAN
R090° DME 25
N35°12.72'
E128°09.65'
At Assigned Altitude
NIKET (exit point)
R090° DME 38
N35°12.75'
E128°25.41'
18
230° Hdg
R-180°
N
Chart Not to Scale!
❶ Controlling obstacle (Mount Mudung)
R-105° Kwangju Tacan DME 10.5
3200ft (4480ft L2elev)
DME 14
N34°59.41'
E127°39.16'
38
IPDAS (exit point)
R180° DME 52
N34°20.91'
E127°37.07'
At Assigned Altitude
DEPARTURE ROUTE DESCRIPTION
TAKE-OFF RWY 02: Climb on Rwy heading until reaching 2300 or above. Thence...
ALADI TRANSITION: Turn left direct to ALADI. Climb at specified altitude.
IGDOK TRANSITION: Turn right heading 080°, Intercept R-070° outbound at DME 16 Then follow R-070° direct IGDOK.
IPDAS TRANSITION: Turn right heading 110°. Cross R-090° DME 12 at or above 5000 then turn right heading 230° to intercept R-180° outbound and direct IPDAS.
NIKET TRANSITION: Turn right direct TEDAN on heading 100°. Then track R-090° outbound direct Niket at assigned altitude.
KWANGJU 3A DEPARTURE (RWY02)
© COMBATSIM CHECKLISTS 2004
KWANGJU AB (RKJJ)
SOUTH KOREA
NOT FOR REAL NAVIGATION - FALCON 4 ONLY

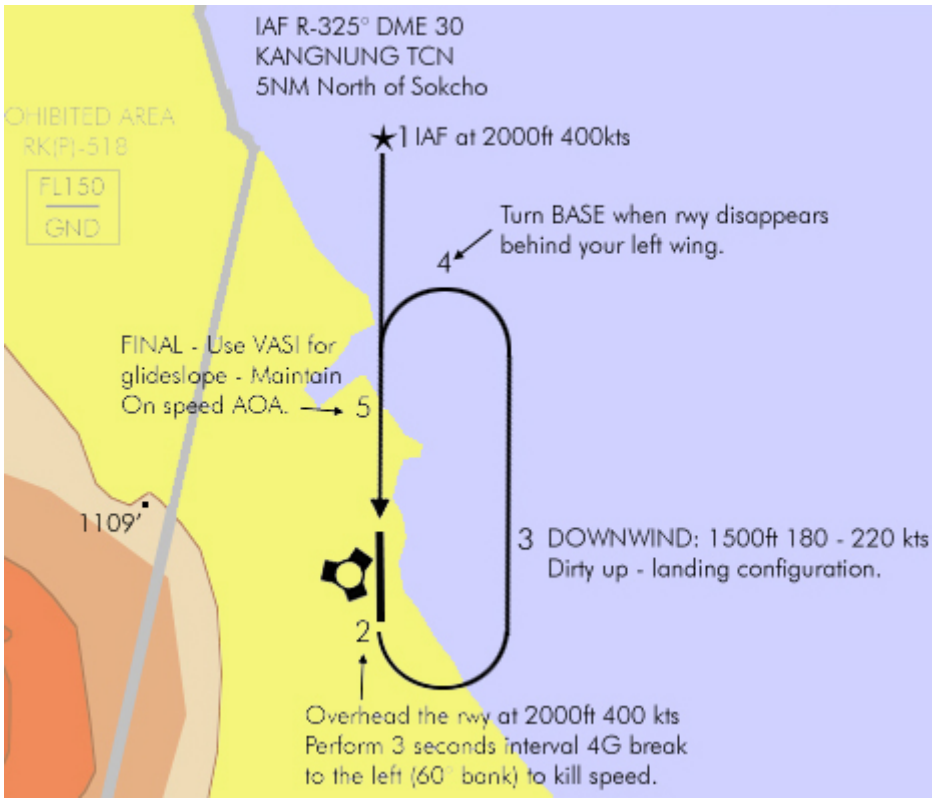
4.4 Special charts



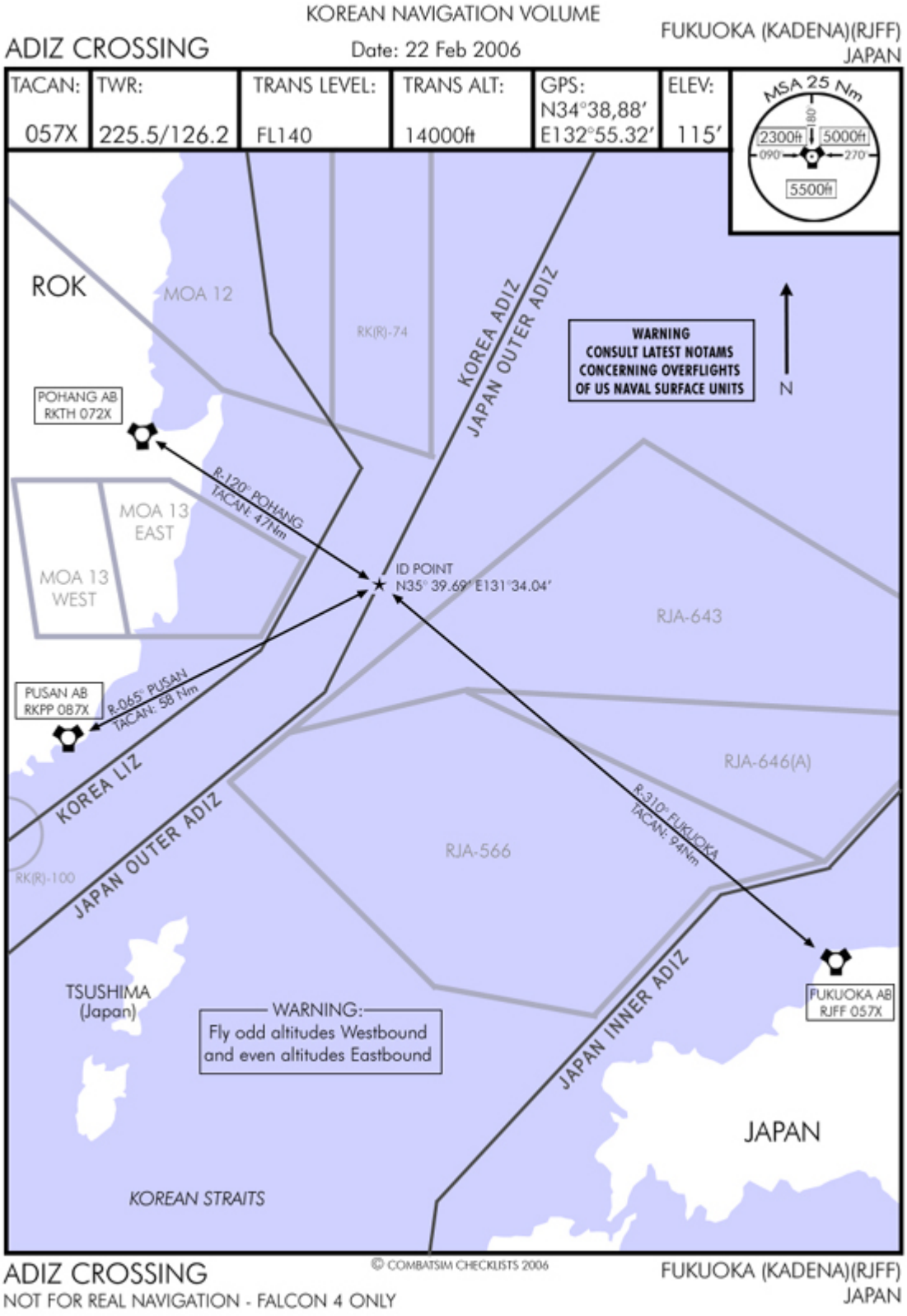
Some airbases have additional special charts. Those are sometime required to document special or temporary procedures. The most obvious one are the NOTAM charts for Sokcho and Hoengsong. These two airports actually are airstrips upgraded to airbase status during the airbase update done for SP2. Since there is no ATC code nor tacan code for airstrips, the assigned tacan and ILS allocated to Sokcho and Hoengsong are not working with current F4 version – although I'm almost certain they worked with the SP series. I don't know what happened in the meantime but the fact remain, the tacan and ILS are unusable. So I decided to make a NOTAM about it on the ILS chart and create a temporary landing chart explaining the Visual procedure to land. Visuals landing pattern should not need to be explained on a chart but I thought it might help beginners, so I decided to do it anyway. The temporary charts should be printed on yellow paper.



Since the tacan is inop. You need to use another tacan in the vicinity to pinpoint Sokcho. The chart tells you that Sokcho is on the R320° radial of Kangnung tacan at DME 26. So to get there, just intercept the 320° radial outbound Kangnung and at 26 Nm, you should be overhead Sokcho.
To land, switch to the temporary chart for landing on runway 18. The 5 steps of the visual approach are explained on the temporary chart while the altitude profile is displayed in the side view at the bottom of the chart. That's all you need to perform a visual overhead recovery at the airstrip. Beware it's quite short and short field landing techniques are required.



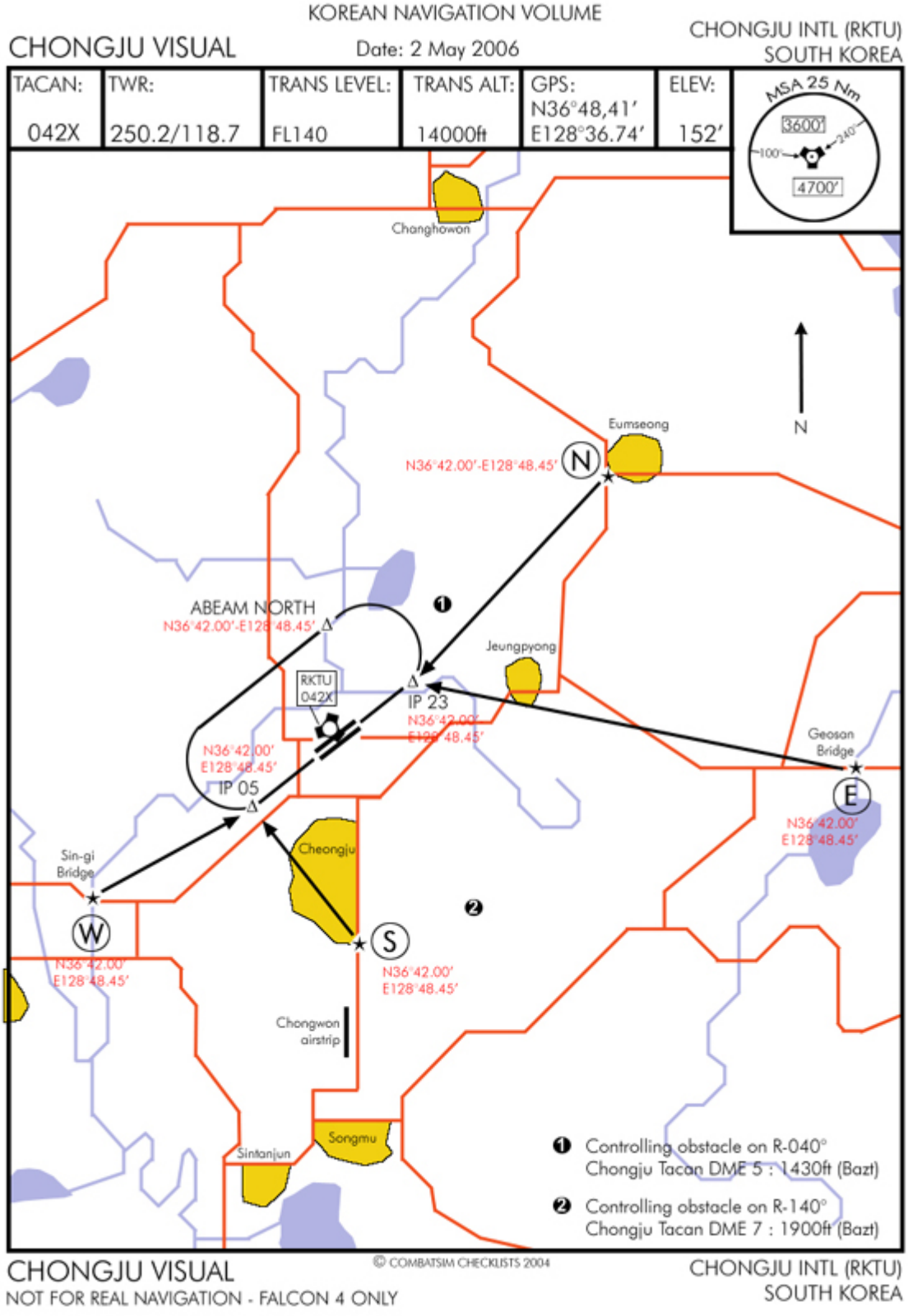
Fukuoka (Kadena) also has its special chart. It's a chart I did for documenting a safe route to cross the Korean straits. During the crossing, aircraft will need to enter the respective country's ADIZ and the aircraft needs to be properly identified at the ID point.



The relevant radials from three main tacan are displayed on the chart: R-120° from Pohang, R-065° from Pusan and R-310° from Fukuoka.
Since all aircraft are likely to be on those corridors, westbound aircraft needs to fly at odd altitudes while eastbound traffic needs to be at even altitude in thousands of feet. That will provide at least a thousand feet separation between crossing flights. But don't worry too much. The AI flights will not follow this route. So the chart is mainly for large multiplayer campaigns.

Last Reviewed: 6th Nov 2006 11:20Z

Another chart type I'm still working on is visual charts for airports. A kind of VFR chart where pilots can see the landmarks necessary to pinpoint the 4 cardinal entry point for a visual recovery.



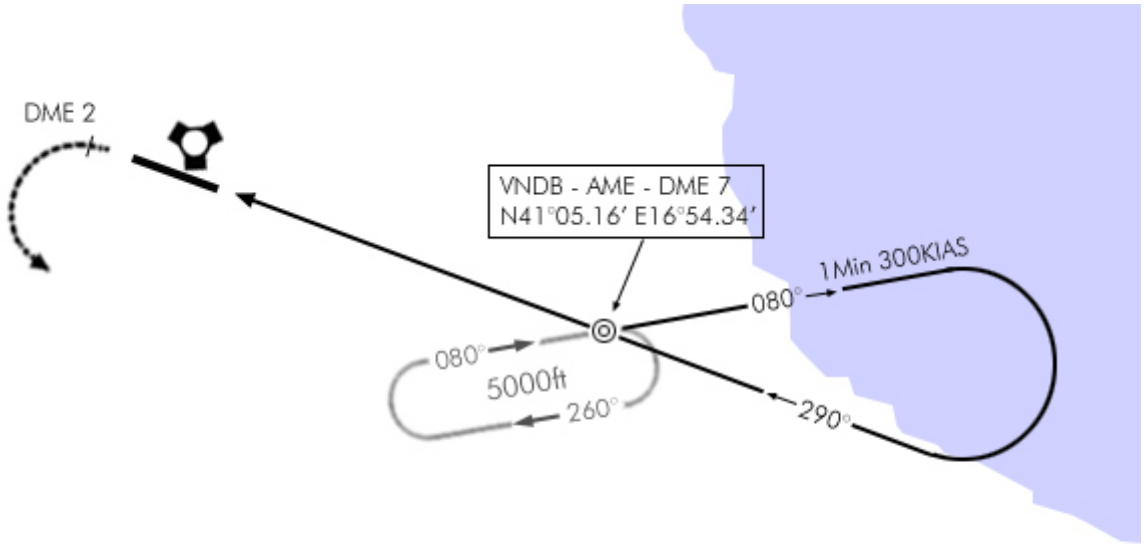
At this time it is only a project I'm working on at the request of Gil who is a French fighter controller. Only Chongju has such a chart but if the project sees the light of the day, probably most airbases will have their own visual chart as well.

The idea is here quite different than IFR charts since the landmarks are F4 compliant. This means that the road and rivers and cities are exactly displayed the way you see them in the Falcon 3D world.
The roads are in red. Cities are yellow and rivers are blue. The entry points are named according to the 4 cardinal points N, E, S and W. Each entry point has its own GPS coordinates.

The purpose is to enter the controlled airspace around the airport at specific points to make life easier on the (human this time) ATC.

More explanations will be given on those charts on future revision of this document, but they are mainly multiplayer specific where ATC is provided by a human controller.

In real life, fun approaches to fly are NDB approaches. Unfortunately we don't have these in Falcon. Although we can simulate them by placing a waypoint where the NDB should be – we just need to know its GPS coordinates. That's what I tried to do with the VNDB approach on RWY 29 of Amendola airport.



The VNDB point is placed along the runway centreline at a distance of 7 Nm from the airbase. As you noticed, the GPS coordinates of this specific point are given. This is good because with that information, we can set the VNDB as the last waypoint of the flightplan for instance. Through the UFC, select the last waypoint before landing and enter its new coordinates. Having done that, the waypoint can now be used as a virtual tacan if two conditions are met:

- The waypoint must be selected as the steerpoint of interest
- The Instrument mode switch must be in NAV position.

You can now use the waypoint as a reference point to fly the above published procedure, as if it were a tacan or a NDB. You can track radial from that point, execute a procedure turn as pictured above and fly racetrack patterns on it.