1. Initial Information

What is it for?

Sim **Randomizer** (*Randomizer*) is a tool that enables you to set various options and variables of flight-simulation programs in a unique way:

- ☆ Controllable degree of randomness, adding **variability** and **uncertainty** (e.g. varied departure/arrival instructions).
- ☆ **Integration** of programs (e.g. *MCE* co-pilots aware of *PF3* procedures and parking assignments).
- ☆ **Randomization of files** used by flight-sim programs and the sim itself (e.g. a random selection of *REX Soft Clouds* textures).

Enjoy it, captains!

Supported Software

- **PF3-ATC at its best (*PF3*)**
- **Multi Crew Experience (*MCE*)**
- File-randomization function provides a generic support for **any** software.

Features:

- (*PF3*) Randomization of the choice between vectoring vs. standard procedure.
- (*PF3*) Fully customizable, preset-specific, execution of departure/arrival procedures with selectable degree of uncertainty.
- (*PF3*) Utilization of SID/STAR names for custom instructions with adjustable probability of their occurrence.
- (*PF3*) Presets for specific airports, runways, times of day or anything you need.
- (*PF3*) Airline-based random selection of gates.
- (*MCE*) Randomization of *MCE* co-pilot selection and mood (with possibility to automatically set the corresponding PF3 pilot voice).
- (*MCE*) Awareness of *PF3* procedures/instructions and gates.
- (*MCE*) Reading of real-world names of procedures (with TTS voices).
- (*MCE*) Randomization of *MCE* scripts.
- (Any software) Randomization of 'active' files. You can easily copy a file from a pool of alternatives, using variables
- Safety. No modification of the target software functionality. Only standard settings are set. Backups. Detailed logs.
- Zero impact on performance of the sim or other programs. *Randomizer* does not run alongside your sim, it sets the parameters and quits.
- Simple UI that enables to easily select presets and profiles and set main settings.
- Extensive customization through ini files.
- Advanced system of variables providing almost unlimited variability.

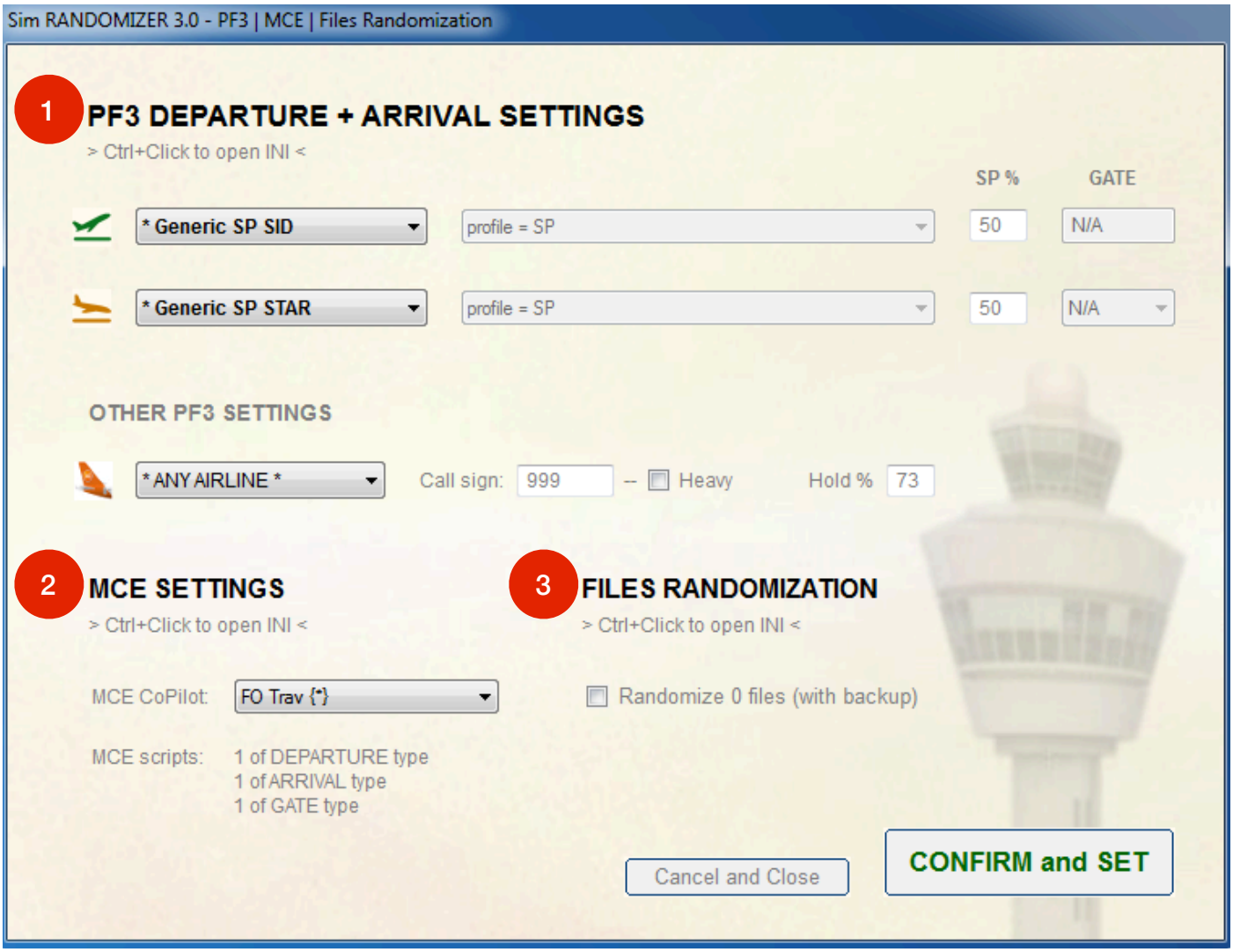
2. Basics

Installation

To install Randomizer, simply extract *Randomizer3.zip* to a dedicated folder on your computer.

UI and Basic Functions

Run *Randomizer.exe* and you will see the following window[1]:



Note: If you do not have Multi Crew Experience (*MCE*) installed, *MCE* Settings will not be available.

Let's take a basic look at the main parts of *Randomizer*'s interface (more information in the 'Details' chapter).

[1] The program does not adjust anything when *PF3* or *MCE* are running! In this case it displays an error message and closes.

1 PF3 DEPARTURE + ARRIVAL SETTINGS

Randomizer provides non-standard ways to set standard *PF3* options, including 'SIDs Active', 'STARS Active', 'SID name', 'STAR name', 'Pilot's Voice', 'Airline', 'Probability of Hold' and 'Designated Parking Control'.

The key element are **Presets** for Departure and Arrival.

Presets are collections of procedures (*Randomizer* calls them 'Profiles') for specific airports, runways, flight conditions, etc..

Currently default 'Generic SP SID' and 'Generic SP STAR' Presets are selected.

Each Preset can include one or more **Profiles**, i.e:

- Specific names of procedure (SID or STAR).
- Generic names of procedure, e.g. 'SP' (Standard Procedure), 'P1' (Procedure One), etc.
- Instructions like altitudes, headings, distances, shortcuts, directs, types of served coffee, anything.
- All types of profiles can include *variables*, which will be discussed later.

You can select a Profile yourself or instruct *Randomizer* to select one (this * R A N D O M * option is available when two or more Profiles are defined in the Preset). The selected Profile will be then transferred to *PF3* as SID or STAR name.

Other settings in the PF3 section:

- **SP%** – Probability that *PF3* will give you the procedure/instructions in the selected Profile, as opposed to vectoring.
- **GATE** – Assigned parking.
- **Other PF3 settings** – Here you can set other parameters from *PF3*'s 'Options #1' 'Main Display'. This is useful not only for the convenience. Airline selection also affects the assignment of gates and Hold percentage can be set in Presets and randomized.

2 MCE SETTINGS

- **MCE CoPilot** – One of *MCE* co-pilots is randomly selected and corresponding PF3 pilot-voice is set. The selection can be overridden.

- **MCE Scripts** – Randomizer is able to write the information from selected presets and the destination's assigned gate to defined *MCE* scripts. It makes your *MCE* co-pilots aware of them. For example, you can ask your co-pilot "Arrival information, please" and he will answer "Direct to final approach point".

3 FILES RANDOMIZATION

Randomization of files is a strong feature that enables to take a file from a pool of alternatives and copy it to the specified destination. It can be a set of INI files with different settings or alternative textures, sounds, anything... Here you can activate / deactivate this feature.

3. Details

Advanced Options in INI Files

All the settings for *PF3*, *MCE* and File Randomization are stored in separate INI files. You can open them directly from the *Randomizer*'s user interface, when you CTRL+Click the links below section titles. Individual options are explained directly in these files.

Editing and Adding Presets and Profiles

CTRL+Click  Departure and  Arrival icons to open corresponding INI files with settings for all the presets and their profiles. Randomizer ships with two kinds of sample presets:

- Generic SP Preset – This preset does not include any profiles. It just randomizes the chance of vectoring vs. getting 'Sierra Papa' instruction.
- Sample Preset – This preset demonstrates the options and includes various sample profiles. Its purpose is to show possibilities and serve as a "database" of ideas for you own presets.

All the generic presets are commented, studying them will help you to master presets and profiles.

TIP: After editing the INI files, you need to refresh the user interface by CTRL+Clicking the heading 'PF3 DEPARTURE + ARRIVAL SETTINGS'.

Variables

One of the core *Randomizer's* functionalities are variables. They can be used in profiles (e.g. for variable headings, altitudes, distances, procedure numbers) and many other "randomizable" settings (e.g. gates, vectoring and hold probabilities). The list of available variables is in the *Appendix 1*.

Gates

This feature is based on the *PF3*'s 'Designated Parking' functionality. *Randomizer* randomly selects one of the gates available at your destination and "reserves" it in *PF3*[2]. You can override this choice and select any other available gate. The parking selection is also performed for the departure airport, but serves only as a "dispatch information", without any consequent actions.

The pool of available gates can be set specifically for each airline and airport in the *Airlines.ini*, which is opened when you CTRL+Click  Airlines icon under 'Other PF3 Settings'. Randomizer always checks, if the parking position matches *PF3* data. If there is no match, the choice is made randomly from all valid parking positions.

[2] Note: The 'reservation' of parking is done the *PF3*'s standard way – writing (or rewriting) a .dat file in the ...*Data**Parking* directory. Previous file is backed up.

Multi Crew Experience (MCE)

Randomizer provides randomization of *MCE* co-pilots and also "bridges" *MCE* with *PF3*. *PF3* profiles are intelligently "translated" and written to *MCE* voice scripts specified in the *Randomizer MCE.ini* file. Please see the comments inside that file for more information, it can be opened directly from the *Randomizer*'s UI (the same way as all the config files).

Another feature called {*free text*} enables you to specify any text that will be used in *MCE* voice scripts instead of automatic "translation". If you use TTS voices, *MCE* co-pilots can even say real-world names of procedures or waypoints. Examples are provided in the 'Arrival to Vienna' chapter below and also in the sample presets inside *Randomizer MCE.ini*.

Files Randomization (FRND)

FRND feature copies files from a specified origin to a specified destination. What makes it useful is the possibility to use variables. All variables listed in the Appendix 1 are available. You can specify as many file-randomization presets as you wish in *Randomizer FRND.ini* (again, you can open it directly from the *Randomizer*'s UI).

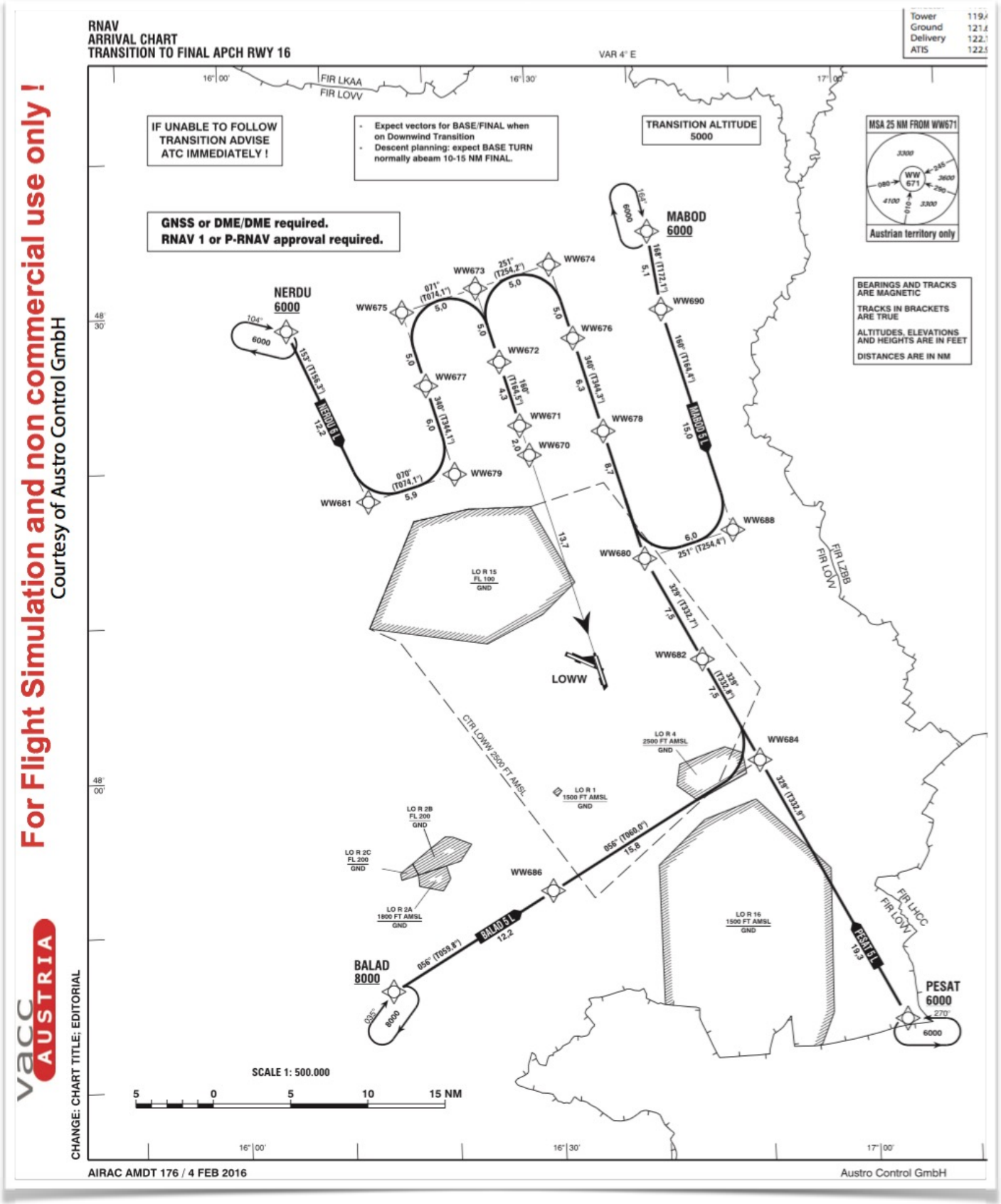
In the following example we copy one of five sound files from one of three listed directories to the *sounds* directory. This way, we randomize *announcement.wav* file:

```
Source=C:\$l(morning,day,night)\sound$d(1,5).wav
Destination=C:\sounds\announcement.wav
```

Safety, backups

On its first run, *Randomizer* backs up your *PF3.ini, PF3* parking .dat files and *MCE.ini*. These backups are kept forever. Also, current backups are made on each execution of settings, when the button 'Confirm and Set' is pressed. No changes are made to any of your files before you press this button. All backups are stored in the 'Backups' folder inside the *Randomizer*'s main directory, files changed by FRND and rewritten parking .dat files are backed up directly at their locations.

Every action that *Randomizer* makes is logged in the *Randomizer.log* file.


RNAV
ARRIVAL CHART
TRANSITION TO FINAL APCH RWY 16
VAR 4° E
Tower 119.4
Ground 121.8
Delivery 122.1
ATIS 122.5
FIR LKAA
FIR LOVV
IF UNABLE TO FOLLOW TRANSITION ADVISE ATC IMMEDIATELY !
Expect vectors for BASE/FINAL when on Downwind Transition
Descent planning: expect BASE TURN normally abeam 10-15 NM FINAL.
TRANSITION ALTITUDE 5000
MSA 25 NM FROM WW671
Austrian territory only
GNSS or DME/DME required.
RNAV 1 or P-RNAV approval required.
BEARINGS AND TRACKS ARE MAGNETIC
TRACKS IN BRACKETS ARE TRUE
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET
DISTANCES ARE IN NM
NERDU 6000
MABOD 6000
BALAD 8000
PESAT 6000
WW671
WW672
WW673
WW674
WW675
WW676
WW677
WW678
WW679
WW680
WW681
WW682
WW684
WW686
WW688
WW690
LOWW
LO R 15 FL 100 GND
LO R 1 1500 FT AMSL GND
LO R 2A 1800 FT AMSL GND
LO R 2B FL 200 GND
LO R 2C FL 200 GND
LO R 4 2500 FT AMSL GND
LO R 16 1500 FT AMSL GND
CTR LOWW 2500 FT AMSL
FIR LZBB
FIR LOVV
FIR LHCC
FIR LOVV
SCALE 1: 500.000
5 0 5 10 15 NM
16° 00'
16° 30'
17° 00'
48° 30'
48° 00'
CHANGE: CHART TITLE; EDITORIAL
AIRAC AMDT 176 / 4 FEB 2016
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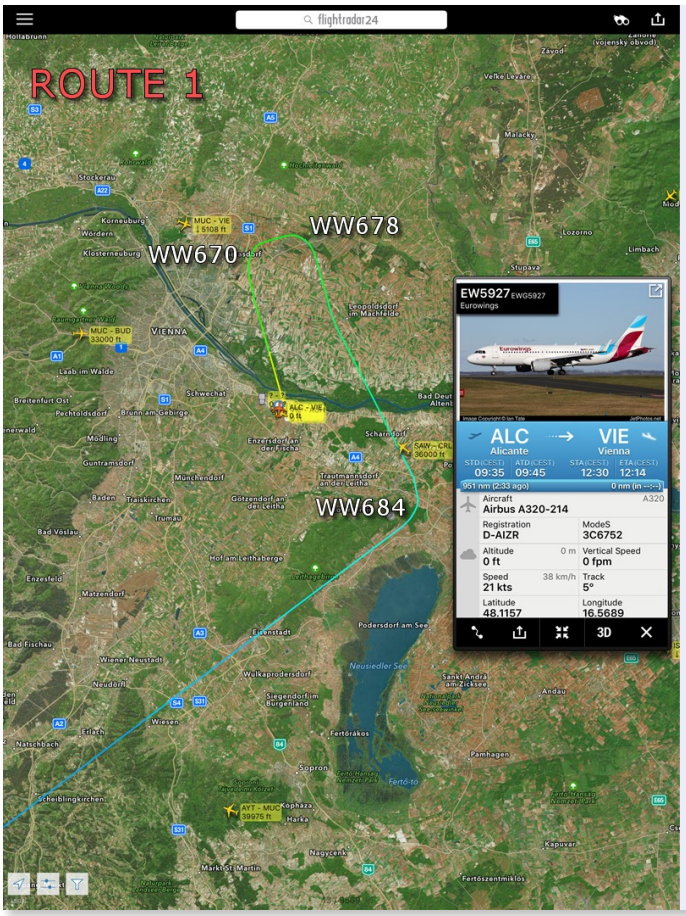
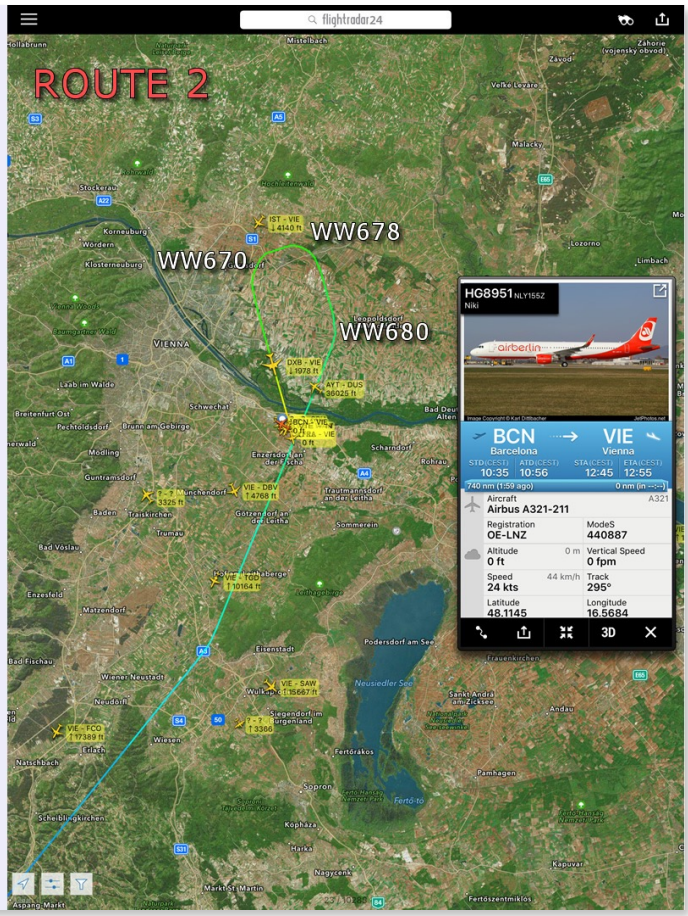
vacc AUSTRIA

Example – Arrival to Vienna

The primary purpose of this example is to demonstrate and explain *Randomizer*'s possibilities, not to provide an ultimate solution for simulating the real-world procedures!





These are the real world routes as recorded by *Flightradar24*. As you can see:

A. These two airplanes did not fly the whole Transition *BALAD 5L*. Actually, the whole transitions are almost never flown here.

B. Both flights got a shortcut from WW678 to WW670, saving 12.6 NM of Transition.

C. Eurowings 5927 from Alicante had to fly the Transition through WW684 (Route 1). 40 minutes later, Niki 8951 from Barcelona was cleared directly to the Waypoint WW680 (overflying the airport) and saving another ca.10 NM (Route 2).

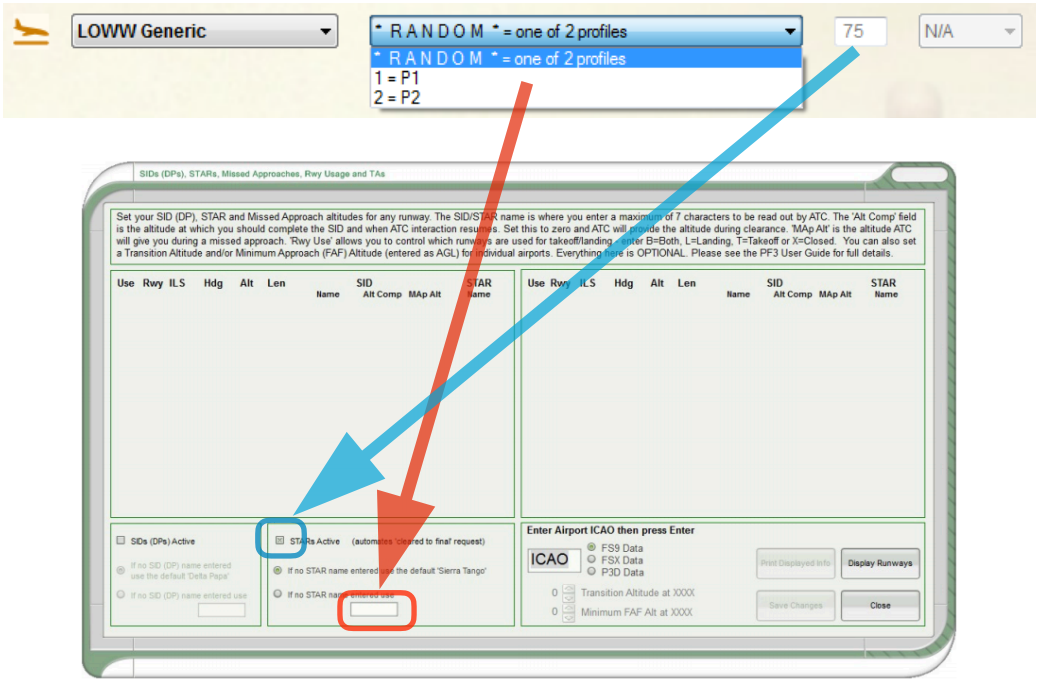
Let's now try to simulate this variability with *Randomizer*.

Examples of Arrival Presets and Profiles

```
[LOWW Generic]

Probability=75

Profile1=P1
Profile2=P2
```

The preset above is very simple, but it demonstrates a concept that I want to discuss before anything else and recommend for consideration. But let's go step by step.

1. First of all, *Randomizer* takes all arrival presets from the *Arrivals.ini* file (and departure presets from *Departures.ini)*. A preset can include one or more profiles. Each profile name must encompass the string 'profile'. This is obligatory, because it tells *Randomizer* that the line defines a profile.
2. All arrival (and departure) presets are listed in *Randomizer* under the 'PF3 DEPARTURE + ARRIVAL SETTINGS' section.
3. When you select a preset from the list, *Randomizer* displays all the profiles included in that preset. Notice that *Randomizer* excludes the string 'profile' and shows only the name itself, i.e. '1' and '2' (see the picture below).
4. When there are two or more profiles in a preset, Randomizer also displays the * R A N D O M * option. Selecting it instructs *Randomizer* to decide which of the presets will be used (each preset gets the same probability).
5. On the execution of settings (when you press the 'CONFIRM and SET' button), the selected profile (by the user or randomly) is transferred to *PF3*. Departure profile is transferred to PF3's 'SID name', Arrival profile goes to the 'STAR name'. In our example, technically, *Randomizer* will write 'P1' or 'P2' to the 'STARName' key in *PF3.ini.*



6. The number to the right of profiles is the probability that *Randomizer* will 'tick' the 'STARs Active' (or 'SIDs Active') checkbox. In our case it is 75%, in accordance with the 'Probability=75' instruction in the preset. It also means that there is a 25% chance that *PF3* will give us vectors (instead of 'P1' or 'P2' instruction).

To summarise, after selecting the * R A N D O M * profile and executing the settings, PF3 will be set to give us one of these alternatives:

- In three of four cases, *PF3* will give us 'Papa One' or 'Papa Two' "STAR" instruction.
- In one of four cases, *PF3* will vector us.

The problem is that a STAR named 'Papa One' or 'Papa Two' is not on the LOWW charts, it does not exist. Or is it really a problem? Not, when you accept the concept that it is the *meaning* of instruction, not its *name*, what matters. If you *interpret* the 'Procedure Two' as the 'Route 2' shown on the picture at the beginning of our example (i.e. 'Direct to waypoint WW680, then the shortcut from WW678 to WW670'), this simple solution will do. It is generic enough that you can use it not only for all the arrivals to Vienna, but, basically, for any approach or departure.

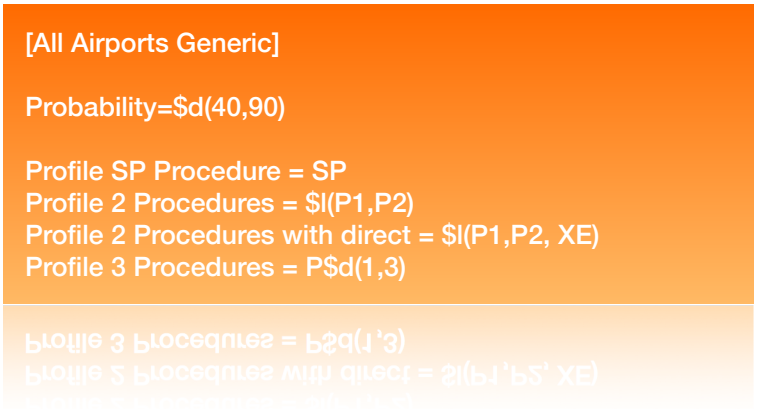
If you don't like the concept of generic profiles, you can use *Randomizer*'s presets as a 'database' of ***procedures***, for example:

```
[LOWW Transitions]

Probability=80

Profile BALAD 11 = BALAD3K {balad three kilo}
Profile BALAD 16 = BALAD5L {balad five lima}
Profile BALAD 29 = BALAD4M {balad four mike}
Profile BALAD 34 = BALAD3N {balad three november}
Profile NERDU 11 = NERDU4K {nerdu four kilo}
etc.
```

The text within curly brackets {} will be transferred to *MCE* and enable its co-pilots, when asked about the arrival, to read the real-world names of procedures.[3] We will explore more details of the interaction between *PF3* and *MCE* later.

Generic and specific concepts can be combined in many ways. You can always try to find a perfect solution for your needs that takes the best of both worlds. Following examples will try to demonstrate some of these possibilities.

[3] Without {free text}, *Randomizer* would try to "translate" the names of procedures for *MCE* and create meaningless instructions. Thus, {free text} is required in this case. Also notice that without TTS voices, MCE is not able to read the word "balad" and skips it. Its prerecorded voices have limited vocabulary. Alternatives like {standard transition}, {bravo transition five lima}, {bravo alfa lima alfa delta five lima}, etc., will do.



This is a more advanced generic solution with a different concept of the profiles selection. Each profile is autonomous. The idea of this preset is to NOT use the * R A N D O M * function, but to select one profile that best suits your flight. Let's take a look at each line of this preset and discuss related functionalities and concepts.

Probability=$d(40,90)
The probability of procedure vs. vectoring is randomized between 40% and 90%[4]. The purpose of this is the variability of the "dispatch information" displayed in the *Randomizer's* UI. The same principle can also be used for the hold percentage.

Profile SP Procedure = SP
When you select this profile, you will get the 'Sierra Papa' arrival, without any randomization. You can be vectored, but that can be overridden in the UI by setting the procedure's probability to 100%, eliminating any uncertainty. *Randomizer* does not force you to randomize anything when it is not appropriate for the flight or your needs.

Profile 2 Procedures = $I(P1,P2)
The variable $I randomly selects one of the listed items (each item gets the same probability). It means that this profile will send to *PF3* the arrival instruction 'P1' or 'P2'.
Note that this is the same result we got from [LOWW Generic] preset discussed above, but now we achieved it by just one line of a profile 'code'. The variability of *Randomizer* provides you with a plethora of possibilities and enables to create very simple or very complex solutions.

Profile 2 Procedures with direct = $I(P1,P2, XE)
Same as the previous profile with the added possibility of 'XE' instruction. *PF3* will read it as 'X-ray Echo'. As a pilot with RUNS[5] training, you will interpret this instruction as 'cleared direct to the end of procedure'. If you have *MCE* with some arrival voice script(s) set up, you can ask your *MCE* co-pilot about the arrival and he will answer 'cleared direct to the end of procedure', because *Randomizer* provides all *MCE* co-pilots with thorough RUNS training.[6] The benefits of this integration of *PF3* and *MCE* are manifold: (1) You will never miss an *PF3*'s ATC instruction as your *MCE* co-pilot will always happily repeat it for you, with RUNS letters 'translated' to normal language. (2) You can ask about the instructions at any time and, if you wish, even before *PF3* gives them (e.g. approach information during descent, assuming your co-pilot is familiar with the approach prediction). (3) If you use TTS voices, your *MCE* co-pilots can even give you real-world names of procedures and waypoints, when set through {free text}.

Profile 3 Procedures = P$d(1,3)
The same as 'Profile 2 Procedures', but with another procedure 'P3' added (you will use it, obviously, when the planned approach has three different variations) and achieved a slightly different way ($d used instead of $I).

---

[4] Please see the Appendix 2 for the list of available variables and their explanation.

[5] 'Randomizer Unified Naming System'. See Appendix 2 for the complete list of RUNS instructions.

[6] Technically speaking, Randomizer intelligently 'translates' RUNS letters to meaningful instructions and then writes them to MCE voice scripts according the *Randomizer MCE.ini* file. Please check *Randomizer MCE.ini* to get details about this functionality.

```
[LOWW Autonomous Profiles]

Probability=$I(70,80,90,100,100,100)

Profile BALAD RWY 16=XW$i(84,82,80)C$I(78,78,76) {XW$i(84,82,80), at $I(78,78,76) turn to $j(base, final approach point)}
Profile BALAD5L = BALAD5L {balad five lima}
Profile BALAD All RWYs = BALAD {balad}
Profile Generic=$I(TC1,TC1,TC2,T)
Profile Generic with Direct=$I(TC1,TC1,TC2, XE,X)
```

We will finish our trip to Vienna with a more advanced preset. First of all, the profiles are, again, autonomous. You will select one according your actual needs, not use the * R A N D O M * option.

Profile BALAD RWY 16

The first profile perfectly covers our sample situation. Randomizer selects one of the three directs, then one of the two shortcuts (with higher probability of C78). As you can see, the real-world names of waypoints are shortened (e.g. W82 instead of WW682) and shortcuts are simply defined by starting points (e.g. C78 means 'shortcut from WW678 to WW670). MCE reading is customized, with additional variability ('base' or 'final approach point' instruction). With this profile your routes will match the real-world ones very well. Of course, you can make such a profile for all the approach variations (i.e. initial approach fixes and runways).

Runway independent profiles

Randomizer sets everything before the flight and cannot react to changes of take-off or landing runways. You have two basic possibilities how to deal with it:

1. Use a preset/profile which is valid for all the runways (without runway-specific names or instructions).
2. Prevent changes of runways[7].

Notice that while the profile 'BALAD5L' is valid only for runway 16, 'BALAD All RWYs', can be used for any landing runway. The last two profiles ('Generic' and 'Generic with direct') are suitable for scenarios when the landing runway is uncertain or you just don't have any suitable specific profile.

Real-world names vs. instructions

Most of the profiles in this preset do not contain exact names of procedures or waypoints. That demonstrates the concept of using *Randomizer* to generate *instructions*, not *real–world names* of procedures. This approach often provides higher added value, because the name of procedure (e.g. BALAD5L) is usually strictly determined by the flight circumstances, i.e. active runway and the flight plan. Instead of telling me what I already (should) know, I use *Randomizer* to tell me (through *PF3* and *MCE*) something that I don't know, like ad-hoc instructions that *modify* a standard procedure. Clearances for directs, which are realistic under specific circumstances, but not achievable by any generic ATC software, are good example of such instructions.

Endless possibilities

All the examples discussed above can be altered, extended or combined and are only the beginning of almost endless possibilities.

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[7] I use a tool called *AI Controller* to set and fix the active runways, usually according to the real-world state at the time of my flight. If, for whatever reason, I *allow* runway changes, I use a runway-independent preset/profile. Future versions of Randomizer could eventually utilize the *PF3*'s per-runway SIDs/STARs, which will eliminate the problem with runway changes completely.

Q&A

How does it work, technically?

Randomizer is programmed in *Autoit* - a freeware scripting language. It only modifies standard keys in PF3.ini and, eventually, MCE.ini. Technically, it does that *exactly* the same way as if you set these settings inside *PF3* or *MCE*. Randomizer *does not directly interfere* with any software as it never makes any changes when affected programs are running.

Will *Randomizer* always make my simulated flights better?

It depends on your wishes, your knowledge and on what you *believe* is better.

Randomization does not mean chaos! All the possibilities are selected from the pool of data that *you* set, according *your* preferences, *your* expertise and *your* needs. *You* decide what will be set and how.

You have control.

Is it supported by producers of PF3 or MCE?

Randomizer is not affiliated with *Oncourse-Software* or *FS++ Simulations*, it is a third-party personal project. I make it for my own needs and decided to share it with the community. *Randomizer* is free.

Is there a support forum for Randomizer?

This manual is intentionally kept as simple as possible and does not cover every feature of *Randomizer*. Please feel free to ask any question you have on the designated support forum, generously provided by *Oncourse-Software,* producer of '*PF3-ATC at its best*':

http://www.ocs-support.co.uk/forums/viewforum.php?f=10

Thank you, Dave March, for your support!

This version of *Randomizer* would never be released without the support of Ralf (*RALF9636*), PF3 Beta Team member. Thank you, Ralf, for countless hours of testing and many smart ideas!

Roman Heriban

www.sbsim.com

Appendix 1– Variables

You can make your instructions and settings really **variable**. Current version of *Randomizer* recognizes the following variables:

Variable	Description and Examples
$d(x,y)	Returns a random integer number between *x* and *y* (inclusive). Useful (not only) for the randomization of distances. Examples of usage: • XW$d(2,4) – Direct to a *random* waypoint (2, 3 or 4), e.g. 'XW3' • SC$d(1,3) – Standard procedure with a *random* shortcut (1,2 or 3)
$h(x,y)	Returns a random integer number between *x* and *y* (inclusive), rounded to nearest multiple of 5. Useful primarily for headings. • H$h(280,020) – A *random* heading (between 280° – 020°)
$a(x,y)	Returns a random integer number between *x* and *y* (inclusive), rounded to nearest multiple of 5. Useful primarily for altitudes. • RA$a(040,060) – Runway heading to a *random* Altitude (between 4000 and 6000)
$f(x,y)	Returns a random integer number between *x* and *y* (inclusive), rounded to nearest multiple of 10. Useful primarily for flight levels. • SF$f(070,100) – Standard procedure to a *random* flight level (between FL070 and FL100)
$k(x,y)	Returns a random integer between *x* and *y* (inclusive) rounded to nearest multiple of 10. Useful primarily for speeds. • SK$k(170,210) – Standard procedure, maintain a *random* Speed (between 170 and 210)
$i(x,y,z) **$j(x,y,z)** **$l(x,y,z)**	Returns one of the items *x, y, z*. Three identically functioning variables are provided to enable multiple random selections inside one profile. When nesting them, $i has to be inside $j, which has to be inside $l. • XW$l(78,82,84) – Direct to one of the Waypoints • $l(GORLO2N,VALKO3M) – Selects on of the listed SIDs (EHAM, runway 09) • R$l(A$a(045,095),F$f(100,140)) – RWY heading to a *random* Altitude or a *random* Flight level • C$l(32,34,36,36,38) – Gate C *one of listed numbers* (with higher probability of 36)

IMPORTANT NOTES

- Don't forget the **dollar symbol $** as it tells *Randomizer* that a variable follows.
- Variables have to be in **lowercase**.
- Each variable is calculated only **once for a profile.** It means that you cannot use the same variable for more calculations in the same profile. The advantage is that *MCE* {*free text*} and *PF3* always get the same output of a variable calculation, for example:

Sample EDDB HDO Profile = SF$f(060,100)X {SF$f(060,100), then cleared direct to Hermsdorf}[8]

[8] TTS voice required for *MCE* to read real-world names.

Appendix 2 – Randomizer Unified Naming System (RUNS)

Randomizer recognizes following capital letters as flight instructions and automatically "translates" them when profiles are transferred to *MCE* voice scripts. *PF3* will just spell these letters phonetically as any other letters, but it is still recommended to use them for potential sharing purposes, even when you do not use *MCE*.

Letter	Randomizer's Interpretation
A	**A**ltitude
C	short**C**ut
D	**D**istance
E	**E**nd of procedure
F	**F**light level
H	**H**eading
K	speed (**K**nots)
L	no altitude **L**imits
O	h**O**ld
P	**P**rocedure
R	**R**unway heading
S	**S**tandard procedure
T	**T**ransition
W	**W**aypoint
X	cleared direct (through like '**X**-ray')
Y	visual approach (**Y**our discretion)