

## User Manual

# Real Random Failure (RRF)

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[Upgrading to Full Premium Version](#)

Version	Changes
1.30	<b>Added CallMeBot pager setup</b>
1.40	<b>Added guide on Failure Memory &amp; Auto Increasing Probability features</b>

## What is Real Random Failure (RRF)?

Real Random Failure (RRF) is a flight simulation add-on designed for platforms like MSFS 2020/MSFS2024 that brings true unpredictability into virtual flying by introducing realistic, randomized aircraft failures. Instead of knowing when or what will break, pilots fly normally while the system quietly determines if—and when—something goes wrong, creating a more immersive and authentic experience. It supports scenario-based training, from everyday flights to simulator line checks, and even random inoperative equipment at startup. Users can define custom failure profiles and probabilities, making each flight unique and aligned with real-world uncertainty. With features like SimBrief integration and mobile cockpit alerts, RRF turns routine

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sim sessions into dynamic, decision-driven operations where pilots must always be ready for the unexpected.

## System Requirements

- MSFS2020
- PMDG 737
- MSFS2024 - Coming Soon
- Other PMDG aircraft - Coming Soon
- MSFS generic aircraft failure - Coming Soon

## Installation

- Download RRF installer installation from [realrandomfailure.com](https://realrandomfailure.com)
- Install the addon application as usual using the windows installer
- Run the application from the Windows Start menu

The installation does these things at the background:

- Install the application into typical C:\Program Files folder
- Create **rrfconfig** folder in your **My Documents** folder to store configuration and log files
- Create shortcut in Windows Start menu

Note: The installation does not store anything in the MSFS **Community** folder.

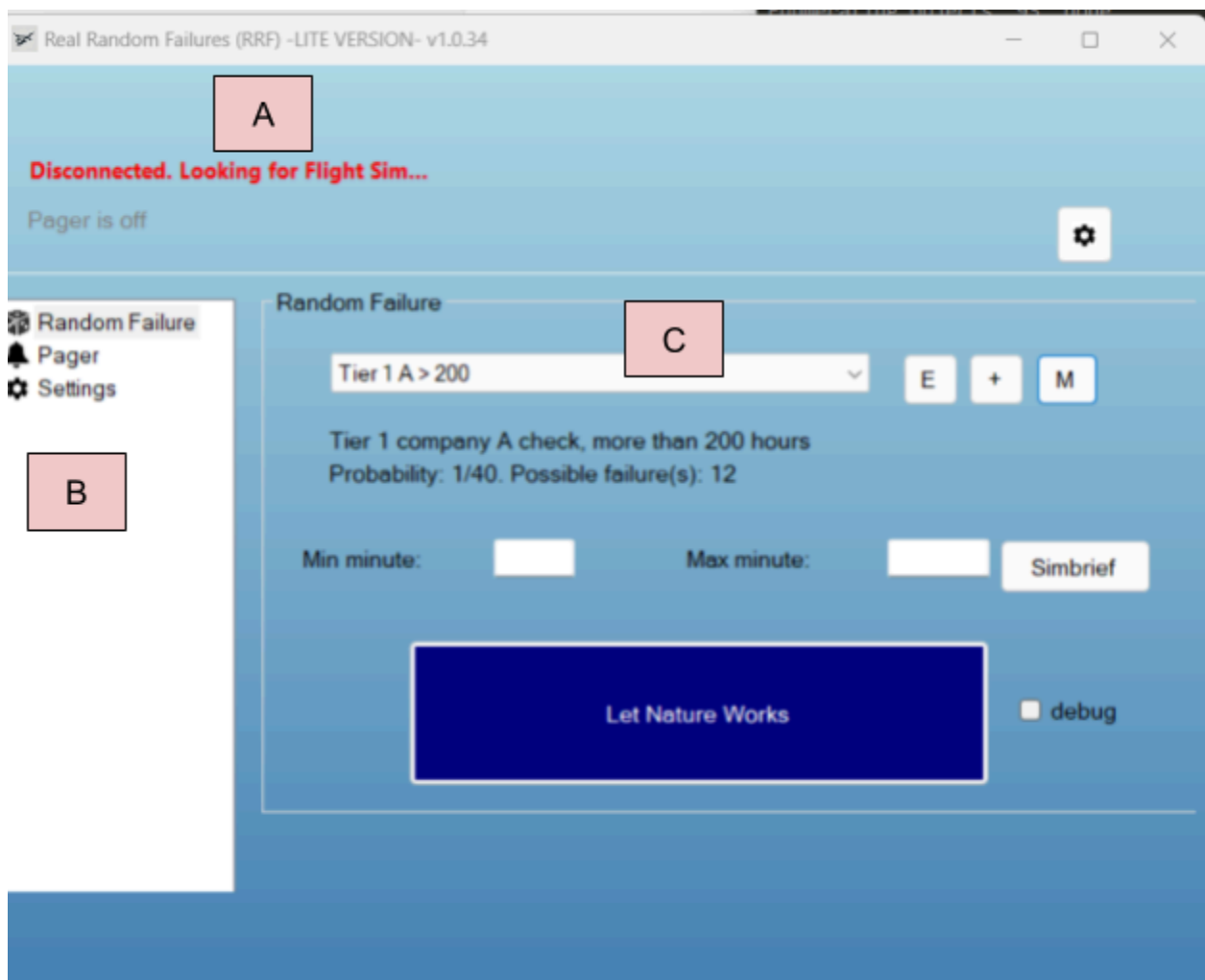
## Running the Installed RRF

- From the Windows Start menu, find or search Real Random Failure (RRF)
- You may start prior or after the start of MSFS. However, RRF is intended to be actually used after MSFS is started and aircraft is loaded and ready.

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Note: RRF is a freemium software. You may run and use RRF as long as you want, however with limited functionalities. Upgrade your copy of RRF to enjoy the full and unlimited features. [More information, see Upgrading RRF to Full Premium Version.](#)

## RRF User Interface Familiarization



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## [A] Simulator Connection & Pager Status Panel

Here is where the connection status to MSFS is displayed. And also the pager status whether it is on or off.

## [B] Menu Panel

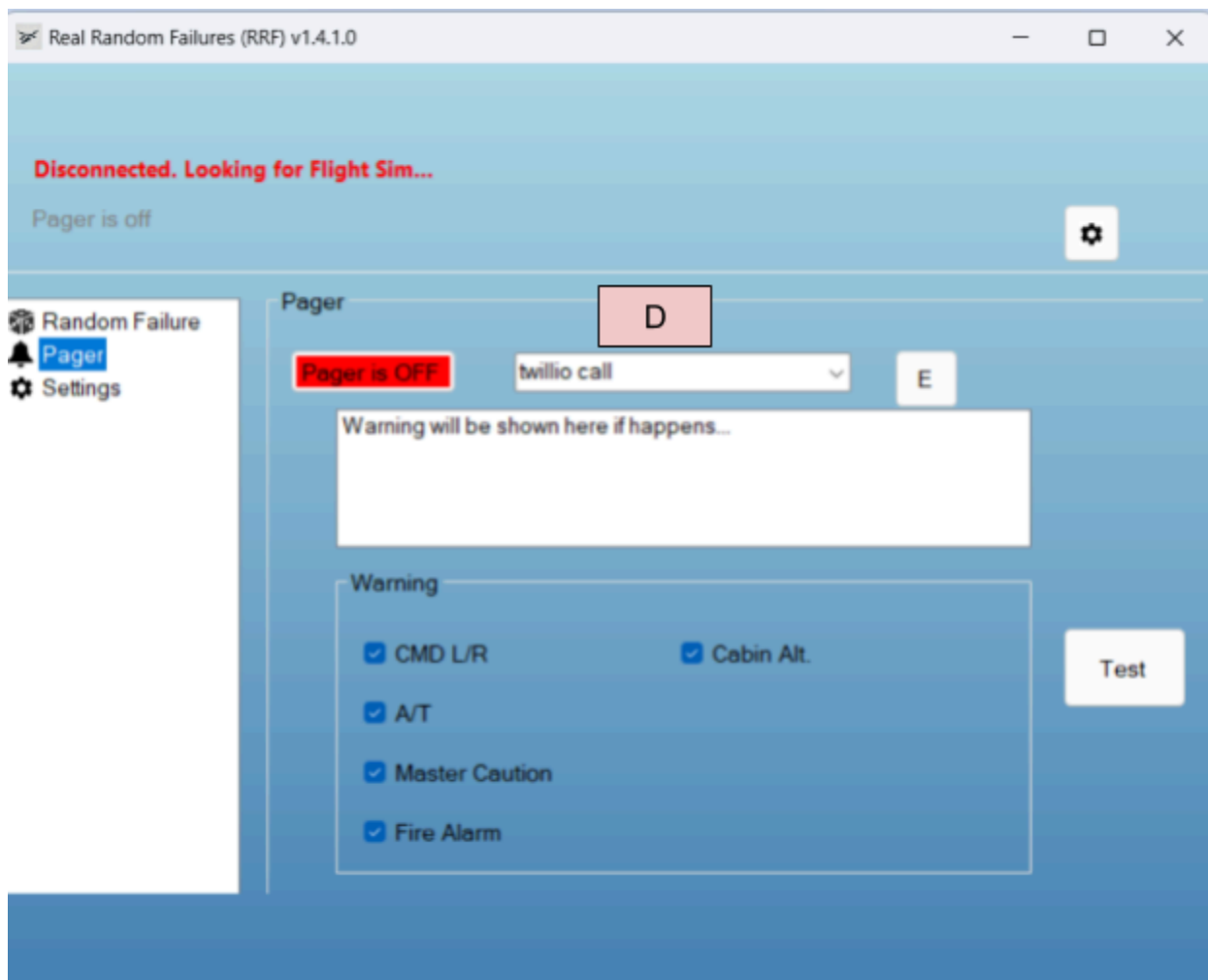
You may go to different application pages for various other functionalities.

- **Random Failure** (default page) - This is where you set all the failure profile and start RRF failure randomization
- **Pager** - Setup Pager configuration and turn on or off pager functionality
- **Settings** - Setup various application-wide settings and configurations

## [C] Random Failure Page

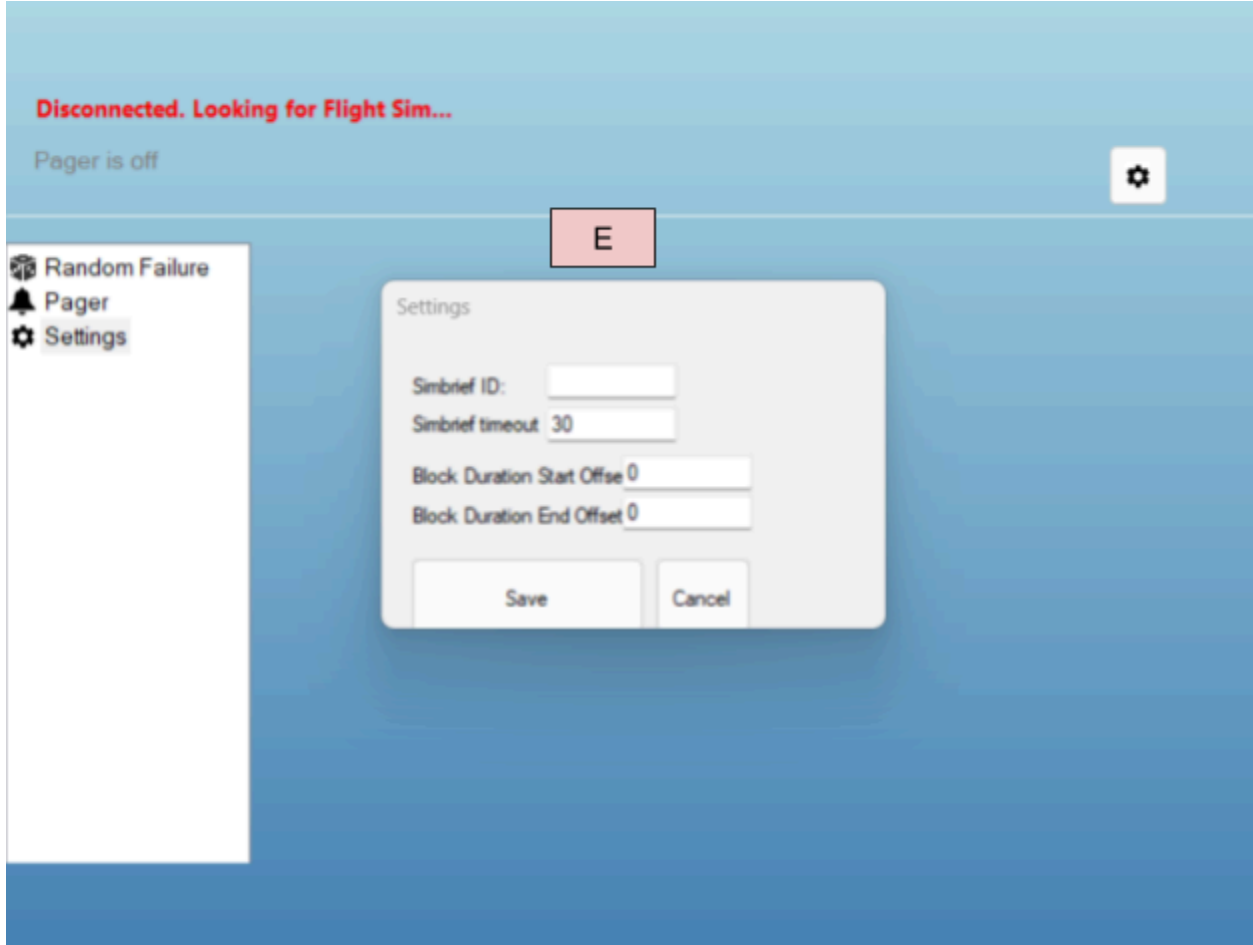
- List of Random Failure Profiles - contains a list of different random failure profiles
- Edit Random Failure Profile button (“E” button) - button to edit an existing random failure profile
- Add Random Failure Profile button (“+” button) - button to add a new random failure profile
- Failure Maintenance button (“M” button) - for doing maintenance on memorized failure and auto-increasing probability features
- Quick Information Panel on Failure Profile - contains information of the profile selected
- **Min Minute & Max Minute** textboxes - input for when the randomized failure (if it happens) to be armed. It is a time range in minutes e.g. if min minute is set to 30 and max minute is set to 120, the randomized failure (if it happens), will be armed randomly between 30 minutes and 120 minutes from the time the randomization is triggered. Essentially it should be the flight block time range, however you may want to customize the time range.

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- **Simbrief** button - if you have planned your flight via Simbrief, clicking this button will retrieve the flight block time from Simbrief and automatically populate the block time range into the **Min Minute** and **Max Minute** textboxes
  - Simbrief OFP info - whenever Simbrief flight is fetched, basic information of the flight will be shown here
  - **Let Nature Works** button - this is the button when you want to execute the randomization process as per the selected randomized failure profile in the profile list
  - **Debug** option - when starting the randomization process by clicking the **Let Nature Works** button, if this **Debug** checkbox is checked, RRF will not actually connect to PMDG, RRF will instead do the randomization as a standalone. It is designed to debug or troubleshoot randomization algorithms without MSFS and PMDG connection.



## [D] Pager Page

- Pager On/Off button - the button for toggling the switch for pager on and off
- Pager setting list - the list of different pager settings
- Edit button ("E" button) - To edit existing pager settings
- Warning list panel - If any cockpit warning event has happened, it will be listed here
- Warning status and selector panel - Here you may select which kind of cockpit warning is enabled to be paged if the warning occurs. It shows the real-time cockpit warning status as well.



## [E] Settings Page

- **Simbrief ID** - your Simbrief ID for auto fetching the flight block time. This is optional.
- **Simbrief Timeout** - time in seconds RRF will wait for Simbrief response before considering it down (default and recommended 30 seconds)
- **Block Duration Start Offset** - time in minutes RRF will automatically add to **Min Minute** on **Random Failure** Page.
- **Block Duration End Offset** - time in minutes RRF will automatically add to **Max Minute** on **Random Failure Page**. E.g. If the total flight block time from Simbrief is 60 minutes and if the value for **Block Duration End Offset** is set to 20, the **Max Minute** will be automatically adjusted to 40 minutes

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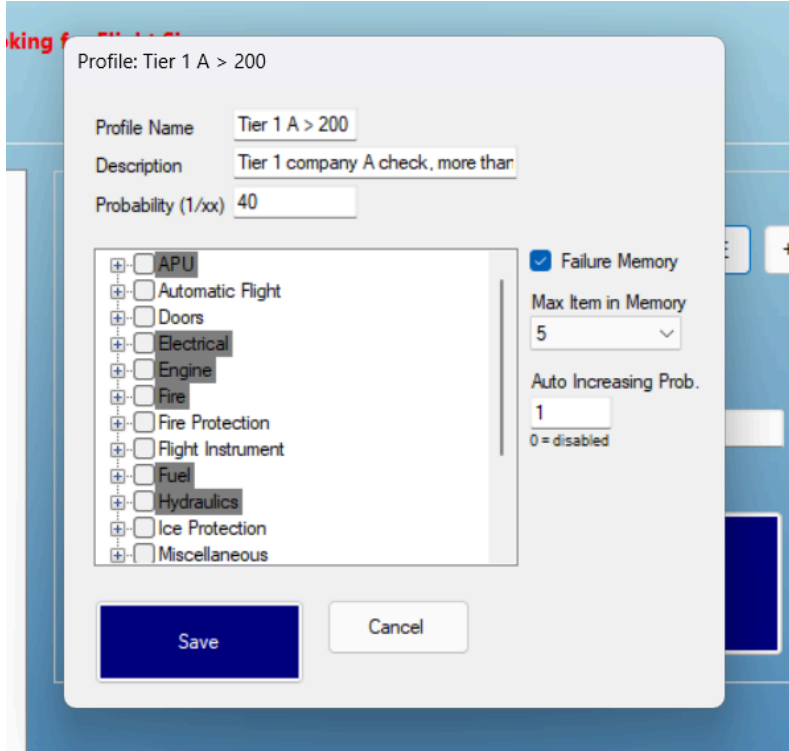
## Setting Up Randomized Failure Profile

Multiple randomized failure profiles can be set up. Each randomized failure profile essentially represents a different set of failures, probability, wear-and-tear effect & memorized failure.

Note: wear-and-tear effect currently implemented but not yet configurable. See [Other Features but Currently not Configurable](#)

### To create a randomized failure profile:

1. On the **Random Failure Page**, click **Add Random Failure** Profile button (The + button)
2. Enter **Profile Name** and **Description** (free text)
3. **Enter Probability (1/xx)**. For example, if you want the chance of the failure to happen 1 out of 60 flights, you can enter 60 (whole positive number only). Entering value of 1 means that the failure will surely happen (1 out of 1 flight)
4. Select any failure that if the flight is destined to have failure, RRF will randomly choose any of these selected failures. You may choose one or multiple failures.
5. If you want to enable the Failure Memory feature, check the **Failure Memory** checkbox. If you have this enabled, you then need to select the maximum number of memorized items. Selectable from 1 to 5 maximum memorized items. For more details on this feature see [here](#).
6. If you want to enable auto-increasing probability feature enter a whole number integer value into the **Auto Increasing Prob.** text box. Suggested value is between 1-5. If you do not want this feature to be enabled, enter 0 into the textbox. For more details on this feature see [here](#).
7. Click the **Save** button



To edit an existing randomized failure profile:

1. On the **Random Failure Page**, click **Edit Random Failure Profile** button (The E button)
2. Update the details accordingly.
3. Click the **Save** button

## Starting Up a Randomization Process

This is the heart of RRF core functionality i.e. to act as the destiny of nature to determine the fate of your flight. For this action, please refer to this Youtube video for more clarity:

<https://www.youtube.com/watch?v=nULDa222XG8>

To start RRF Randomization Process:

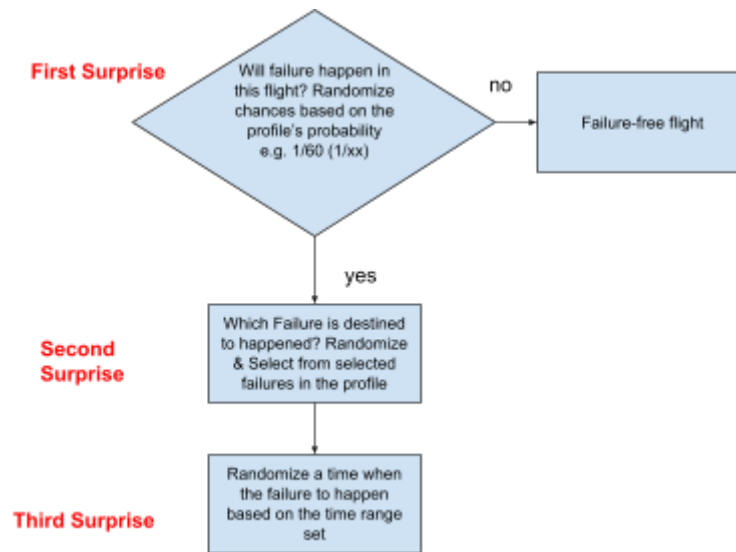
1. Start MSFS and then start the PMDG 737

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2. Start the FMC (essentially before the overhead battery power is switched on) by pressing and hold the FMC **Menu** button
  3. Start RRF application
  4. On the RRF **Simulator Connection & Pager Status Panel**, confirm that RRF is connected to MSFS
  5. Select any Failure Profile on the list
  6. If you have filed your flight through Simbrief, click the Simbrief button to fetch your flight block time and the value will be auto populated in the **Min** and **Max Time** range textbox
  7. Click the **Let Nature Works** button for the nature to be really doing its role
  8. Do not look at the FMC/CDU at this moment as RRF is interfacing with PMDG CDU. The secret and the surprise of nature is happening at the CDU now. (unless you want to intentionally see how it's done).
  9. Wait till a popup with "Have a safe flight captain" appears. Click the **Close** button.
  10. To confirm RRF has completed its secret work at the CDU successfully, take a look at CDU now, RRF has left a wording in the scratchpad with **Done**
  11. You can now close RRF application

**IMPORTANT:** if you plan to load a PMDG panel state, please do these randomization process steps above **ONLY AFTER** you have loaded the panel state. Otherwise, if there is a PMDG failure being armed by RRF, it will get overwritten by the newly loaded panel state and the failure won't take effect

**Additional Info:** What is happening at RRF background?

RRF is reading the failure profile you selected and will randomize using the computer randomization capability to see if it is destined to match the probability you set in the profile. If it is destined for failure to occur, the next RRF will randomize which failure from the selected failure(s) in the profile, again another surprise of which failure will happen. Next, still if it is destined for failure to occur, RRF will randomize when the failure will happen based on the **Min Time** and **Max Time** set earlier, in between that time range. The element of "destiny surprise" behind RRF can be depicted in the flow chart below.



Take note that even if in RRF there will be no failure to be armed, if you have the PMDG **Service-based Failure** in the CDU enabled, you will still be prone to that possibility.

## Special Timing: Engine Cut during Takeoff

If the randomized failure is destined to be any of the engine cut during takeoff (before V1/VR/V2), the failure timing is armed immediately by RRF. It will not follow the **Min & Max Time** set. However based on the nature of these special failures, PMDG natively only will make the failure to be in effect during the takeoff roll.

## Use Cases & Workflow of RRF

Here are some examples of use cases and workflow I find interesting when using RRF.

### A to B Flight

This is the most cliché use case as everyone has in mind and probably cover 90% of the use of RRF

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## **Simulate 737 Simulator Line Check**

Imagine, you are doing the bi-annually simulator check with your virtual Line Check Examiner (it's you yourself). You want to test yourself in certain (either specific or within categories of failure) emergency simulation. However you need to set which failures or categories of failures by yourself and you need to set the timing of when the failure is exactly going to happen. Even if you know, as part of the test in the simulator check, failure is surely going to happen, but knowing which failure is going to happen and the exact time when it's going to happen is killing the immersion. Here, RRF can be very useful. With RRF, you have no idea which specific failure or which specific minute the emergency will start to happen.


A sample failure profile for this use case is included in the installation with the name of **"Simulator Line Check"**. Take note that the probability is set to 1 (means confirmed to have failure), with selected failures are set to Engine 1 fire, Engine 2 fire, Pressure Hull Integrity (cabin depressurization emergency case)

## **Random Inoperative System & Equipment**

Real aircraft operation is not 100% problem-free. There are times that some of the aircraft system and equipment are inoperative during the start of a flight. It depends on the aircraft and carrier SOP whether or not the Pilot in Command may continue with flight. RRF may help you randomize those chances without you knowing it. This use case is good if you want to practice Minimum Equipment List (MEL)

## **Different Probability for Different System Failure for the Same Flight**

For the very same flight you are about to fly, you may want to assign different probability for a different set of target systems. E.g. for any engine or APU fire related failure you want to set the probability to 60 (1/60), while for electrical related failures you want to set to 100 (1/100), you



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may do so by creating multiple failure profiles and apply these multiple profiles one by one by running the **Let Nature Works** button twice or more.

### Custom Emergency Scenario (Future Release)

Imagine you want to practice the extreme case of both engines out (like Sully). RRF will implement custom emergency scenarios such as this. RRF will arm the left engine out at a certain/randomized time and then will arm the right engine after that after a certain/randomized time. Other custom emergency scenario in the pipeline:

- Pressurization issue then pneumatic
- Fuel pumps failure then engine flame out
- Cargo aft fire then escalates to Cargo forward fire
- And many more

## Using Pager Feature

RRF Pager lets you be notified in real-time whenever there is any failure going on in the cockpit by detecting any annunciated warning in the master caution, fire warning, cabin altitude warning, autopilot disengage and autothrottle disengage. Currently RRF supports three (3) channels for the real-time notification:

1. CallMeBot. Real-time voice call via Telegram (and can leave a text message as well after the call). Free service by a third party. **Recommended.**
2. Push notification via Alertzy app. Free service by third party
3. Voice call via Twilio. Some charges apply, billed by Twilio.

You may only choose one notification channel. **Note: None of this notification platform has any association with RRF. Use at your own risk.**

## Setting Up Pager Notification Profile

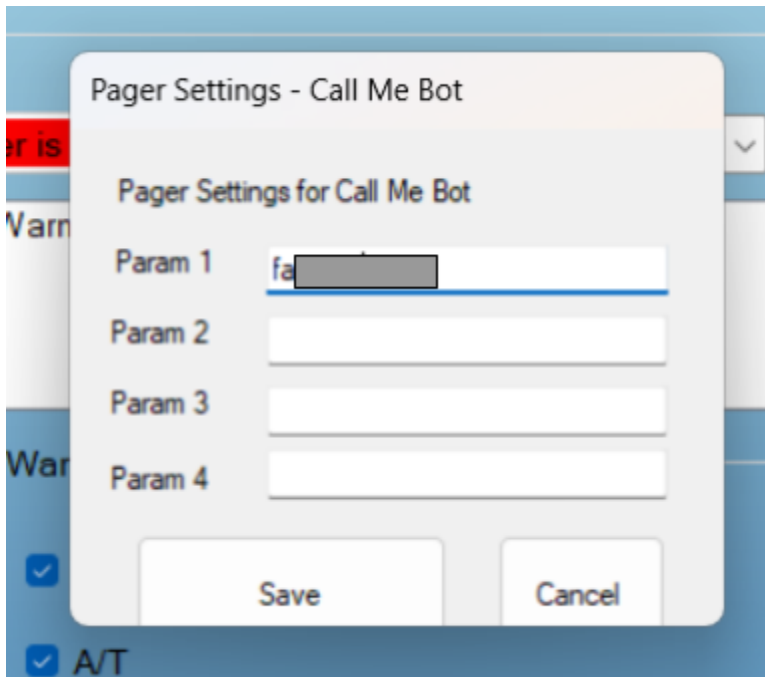
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## Using CallMeBot

1. Initiate CallMeBot authorization process here [Telegram phone Call using your Browser - CallMeBot API](#) by entering your phone no and sample message to send
2. You may need to authorize CallMeBot to send API to Telegram to make a call by following the authorization process as per the link.

```
Checking Authorization for [REDACTED]
Using bot: @CallMeBot_API
Phone number converted to UserID: [REDACTED]
[REDACTED]
Warning! User not authorized. Click here to authorize CallMeBot to contact you.
```

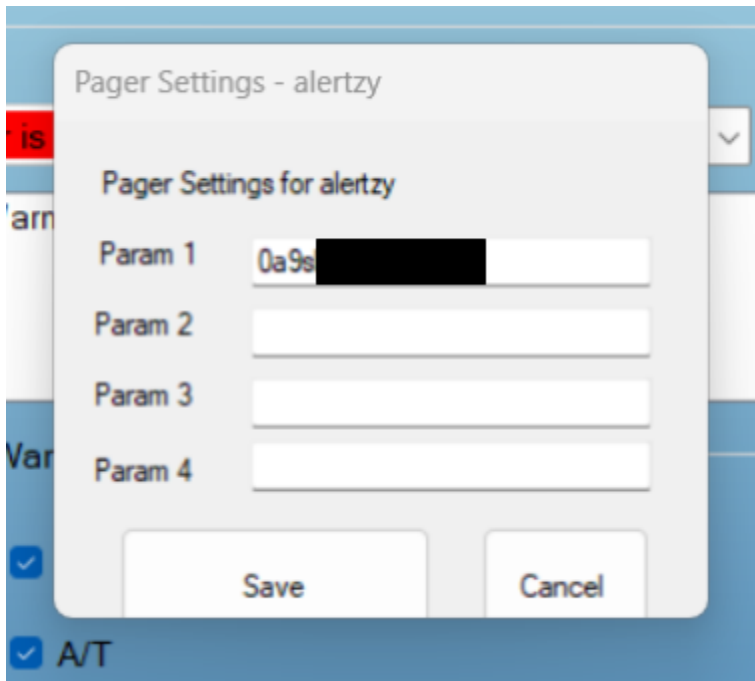
3. Copy or take note of the Telegram user ID provided. RRF will need this Telegram User ID to make a call to you.
4. Open RRF and go the Pager page
5. Select **Call Me Bot** in the pager setting list
6. Click the edit (E) button
7. In the setting popup window, enter your Telegram User ID into **Param 1** textbox
8. Click **Save** button



### Using Alertzy App

1. Download and install Alertzy app on your mobile phone (<https://alertzy.app/>)
2. Open the installed Alertzy app and go to **Account**
3. Copy or take note on the Account Key
4. Open RRF and go the Pager page
5. Select **Alertzy** in the pager setting list
6. Click the edit (E) button
7. In the setting popup window, enter Alerzy Account Key into **Param 1** textbox
8. Click **Save** button

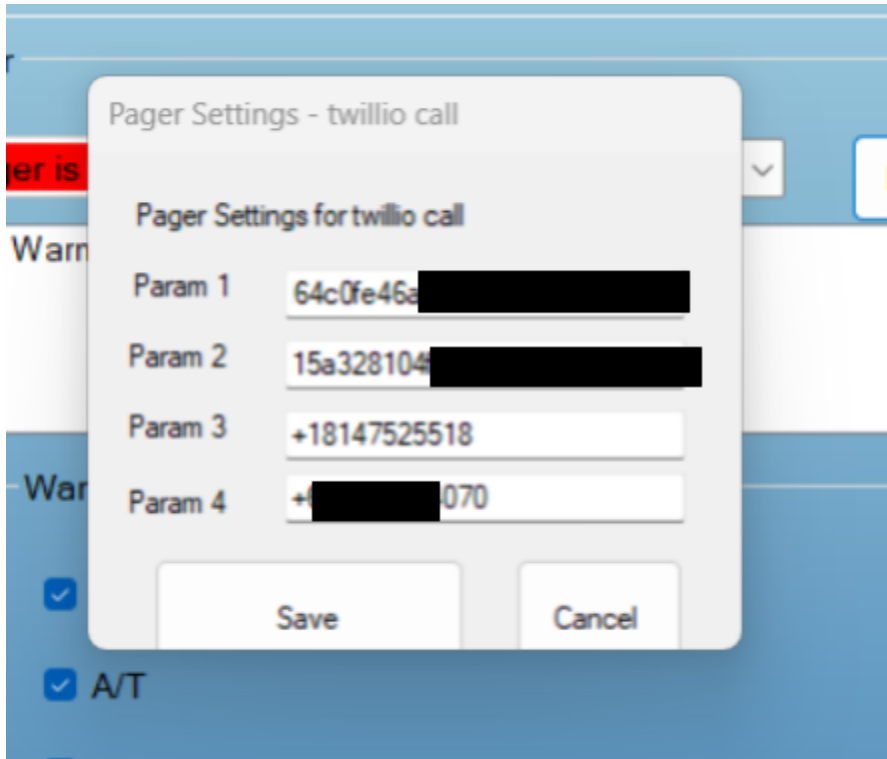
By entering your own Alertzy Account Key, RRF will notify you via Alertzy API so Alertzy platform will know to which device the push notification to be sent to.



### Using Twilio Voice Call (BYOK - Bring Your Own Key)

This method of Twilio Call requires you to create your own Twilio Account and have your own Twilio's **Account SID** and Twilio's **API Auth Token**

1. Go to Pager page
2. Select **Twilio Call** in the pager setting list
3. Click the edit (E) button
4. In the setting popup window, enter Twilio Account SID into **Param 1** textbox
5. Enter Twilio API Auth Token into **Param 2** textbox
6. Enter Twilio active reserved caller phone number into **Param 3** textbox (with country code)
7. Enter your mobile number (with country code e.g. +39 for Italy) into **Param 4** textbox
8. Click **Save** button



Note:

- RRF does not store any of the keys anywhere.

## Starting Pager Service

1. Start MSFS and then start the PMDG 737
2. On the RRF Pager page, take a look at the Warning Status & Selector panel. Check or uncheck any type of warning you want RRF to monitor
3. Click the Pager On/Off button to start Pager service
4. Pager status will change to active (green) in the Pager status panel
5. Any warning event triggered, RRF will list the events down in the Pager warning list panel.

## Stopping Pager Service

1. On the RRF Pager page, click the Pager On/Off button to stop Pager service

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## RRF Log File

If you want to troubleshoot some of the operation of RRF, you may want to look at the RRF log file. The log file is stored in the **My Document -> rrfconfig -> rrf.log**

## Other Cool Features

### Auto-Increasing Probability (Wear and Tear Effect)

If there is no failure destined to be happening in the current flight, the probability of current profile will auto-increase by  $n\%$  in the next flight. This won't change the originally configured probability of failure you set in the profile, instead RRF will auto increase it on the fly dynamically behind the scenes. The incremental rate will keep accumulating and happening in subsequent flights. All in all, the subconscious effect of this feature is the more you fly, the more your aircraft is prone to have higher chances to have failure relative to the previous flights. This creates a pseudo effect of aircraft wear and tear.

This feature is failure profile-specific. You can set the configurable auto-incremental rate of  $n\%$  in the failure profile configuration (**Auto Increasing Prob.** textbox). Recommended values are between 1-5 (i.e. 1% to 5%) but you may set other values of your choice as long as it is the whole number. The calculation of adjusted probability based on this rate is as below:

Original probability you set for the profile:  $P$

Auto increasing rate being set:  $n\%$

Accumulated auto increasing rate ( $n_1\% + n_2\% + n_3\% + n_x\%$ ):  $\Sigma n\%$

Adjusted probability for a specific flight (answer to be rounded up) =  $P - (\Sigma n\% \times P)$

Example calculation:

Original probability you set for the profile: **40**

Auto increasing rate being set: **1%**

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### First Flight

Accumulated auto increasing rate: **1%**

Adjusted probability for a first flight =  $40 - (1\% \times 40) = 39.6 = \underline{40}$  (round up)

### Second Flight

Accumulated auto increasing rate: **2%**

Adjusted probability for a second flight =  $40 - (2\% \times 40) = 39.2 = \underline{40}$  (round up)

### Third Flight

Accumulated auto increasing rate: **3%**

Adjusted probability for a third flight =  $40 - (3\% \times 40) = 38.8 = \underline{39}$  (round up)

...and so on

**Note:** the “probability” in this calculation is reducing not increasing. The reason is RRF is using the 1/x probability concept which the lower the number of x means the higher probability it will be. For example: 1/40 means 1 out of 40 flights may have a chance of having failure is less probable than 1/20 (1 out of 20 flights may have a chance of having failure).

So when the accumulated auto increasing probability is going to stop? This auto-incremental chain of reactions will stop in either of these two ways:

1. When a failure happens, RRF will auto reset the accumulated rate back to 0. **OR**;
2. You manually reset it by yourself using the **Failure Maintenance** screen. See [here](#).

## Memorized Failure

Any failure that occurs in the previous flights will be “memorized” and carried forward to the subsequent flights. This will simulate a system/equipment INOP effect that persists in next flights unless the aircraft mechanic rectifies the issue. Memorized failures carried forward will be armed immediately in the next flights. This feature is failure profile-specific.

In RRF, there is a maximum number of memorized failures allowed i.e. maximum 5 memorized failures. Memorized failures will be carried forward to next flights indefinitely until you as the

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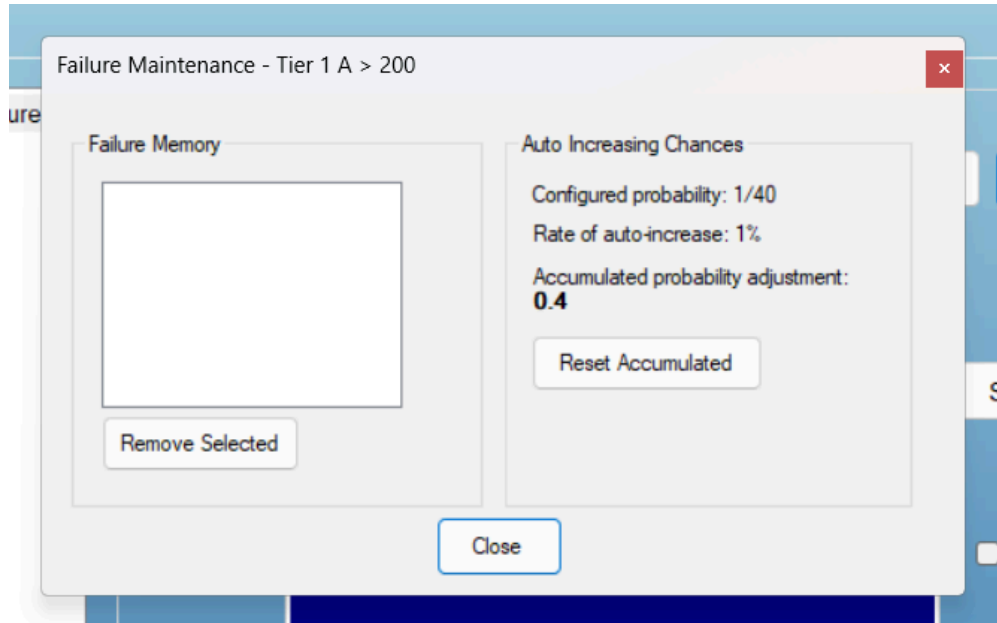
“aircraft mechanic” fix the issues by removing the memorized failure from the failure memory. To remove a memorized failure, see [here](#).

## Using Failure Maintenance Screen to Reset Auto Increasing Probability

To reset the accumulated auto increasing probability:

1. On **Random Failure** page, select a failure profile
2. Click the “M” button
3. Under **Auto Increasing Chances** section, click **Reset Accumulated** button

Note: the **Reset Accumulated** button is only clickable if this feature is enabled for this profile or the accumulated value is greater than zero (0).



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## Using Failure Maintenance Screen to Remove Memorized Failure

To remove memorized failure from the failure memory list:

1. On **Random Failure** page, select a failure profile
2. Click the “**M**” button
3. Under **Failure Memory** section, select a memorized failure item in the list
4. Click **Remove Selected** button to remove the selected memorized

