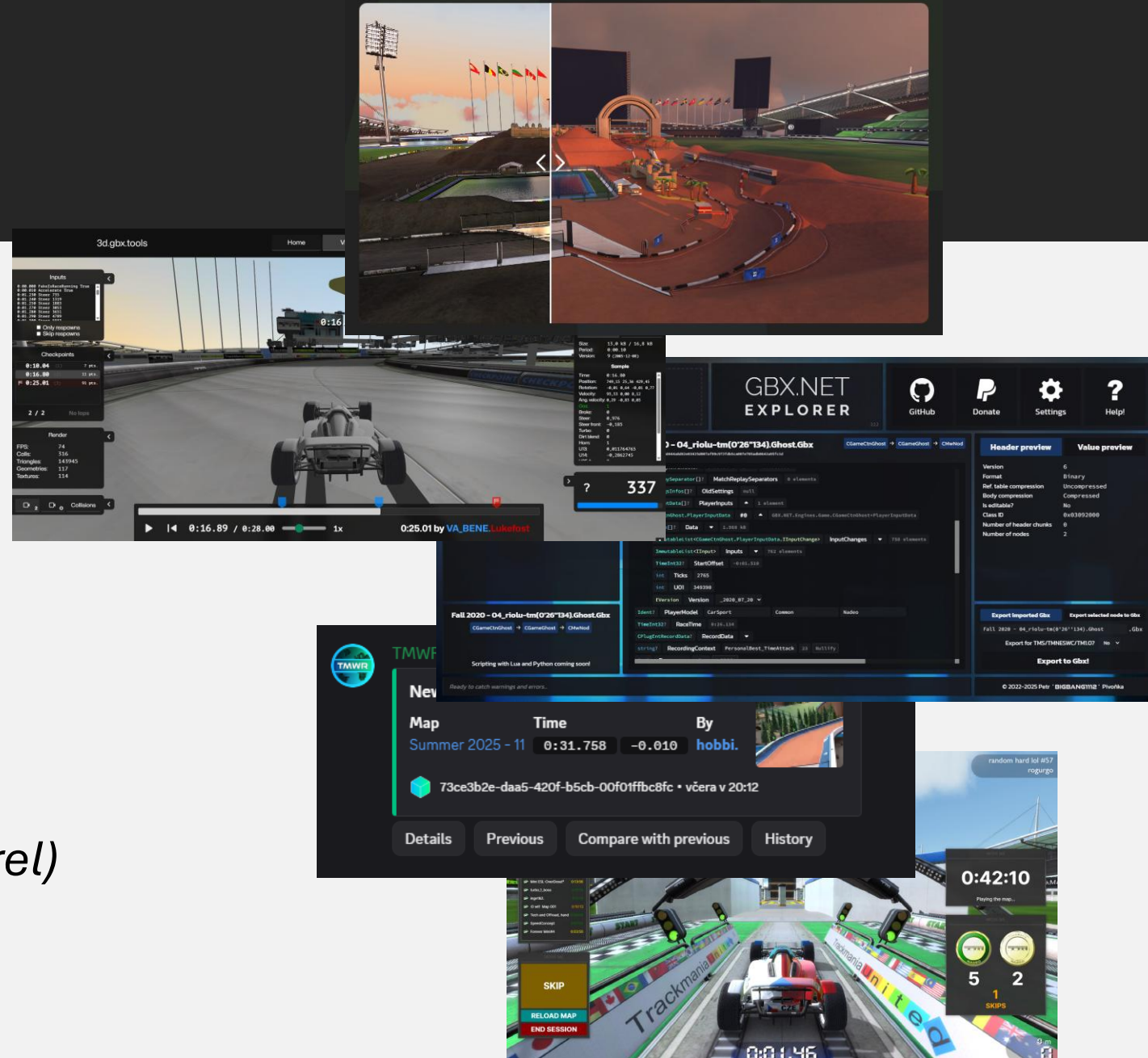


BIGBANG1112's LAB

feat. Auris, Mystixor

Introduction

- Nations Converter
- 3D Gbx Tools
- Gbx Explorer
- TMWR Discord bot
- Randomizer TMF
- Nadeo Envimix (ft. Poutrel)



So what's the topic?



Environments

Vehicles



Stadium



Stadium256

Blocks

Decorations

NO
ICON RallyCastleWallDiagRightStartCurve2OutFCTNO
ICON RallyCastleWallDiagRightStartCurve2OutPillarNO
ICON RallyCastleWallDiagRightStartStraightX2FCBNO
ICON RallyCastleWallDiagRightStartStraightX2FCTNO
ICON RallyCastleWallDiagRightStartStraightX2PillarNO
ICON RallyRoadDirtHighToOpenSlope2StartNO
ICON RoadBumpDiagLeftStartCurve1InNO
ICON RoadBumpDiagLeftStartCurve1OutNO
ICON RoadBumpDiagLeftStartCurve2InNO
ICON RoadBumpDiagLeftStartCurve2Out

start



RoadBumpDiagLeftStartCurve2In

Air

Ground

Mesh: Stadium\Media\Prefab\RoadBump\DiagLeftStartCurv

> (DiagLeftStartCurve2In_Air.Prefab.Gbx)

DiagLeftStartCurve2In_Air.Prefab.Gbx





Environments

Vehicles



Stadium



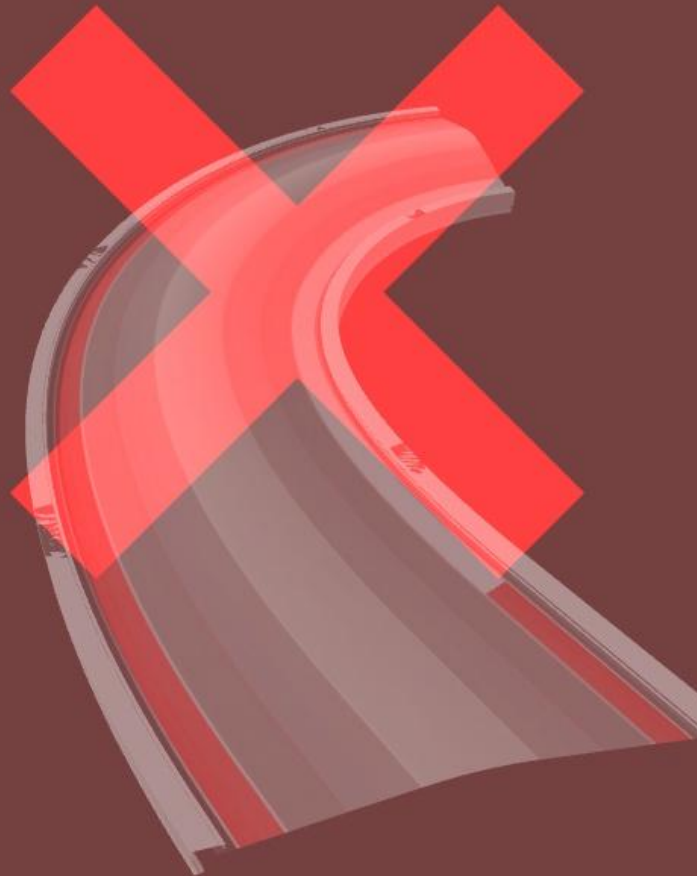
Stadium256

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ICON RallyCastleWallDiagRightStartStraightX2FCTNO
ICON RallyCastleWallDiagRightStartStraightX2PillarNO
ICON RallyRoadDirtHighToOpenSlope2StartNO
ICON RoadBumpDiagLeftStartCurve1InNO
ICON RoadBumpDiagLeftStartCurve1OutNO
ICON RoadBumpDiagLeftStartCurve2InNO
ICON RoadBumpDiagLeftStartCurve2Out

start



RoadBumpDiagLeftStartCurve2In

Air

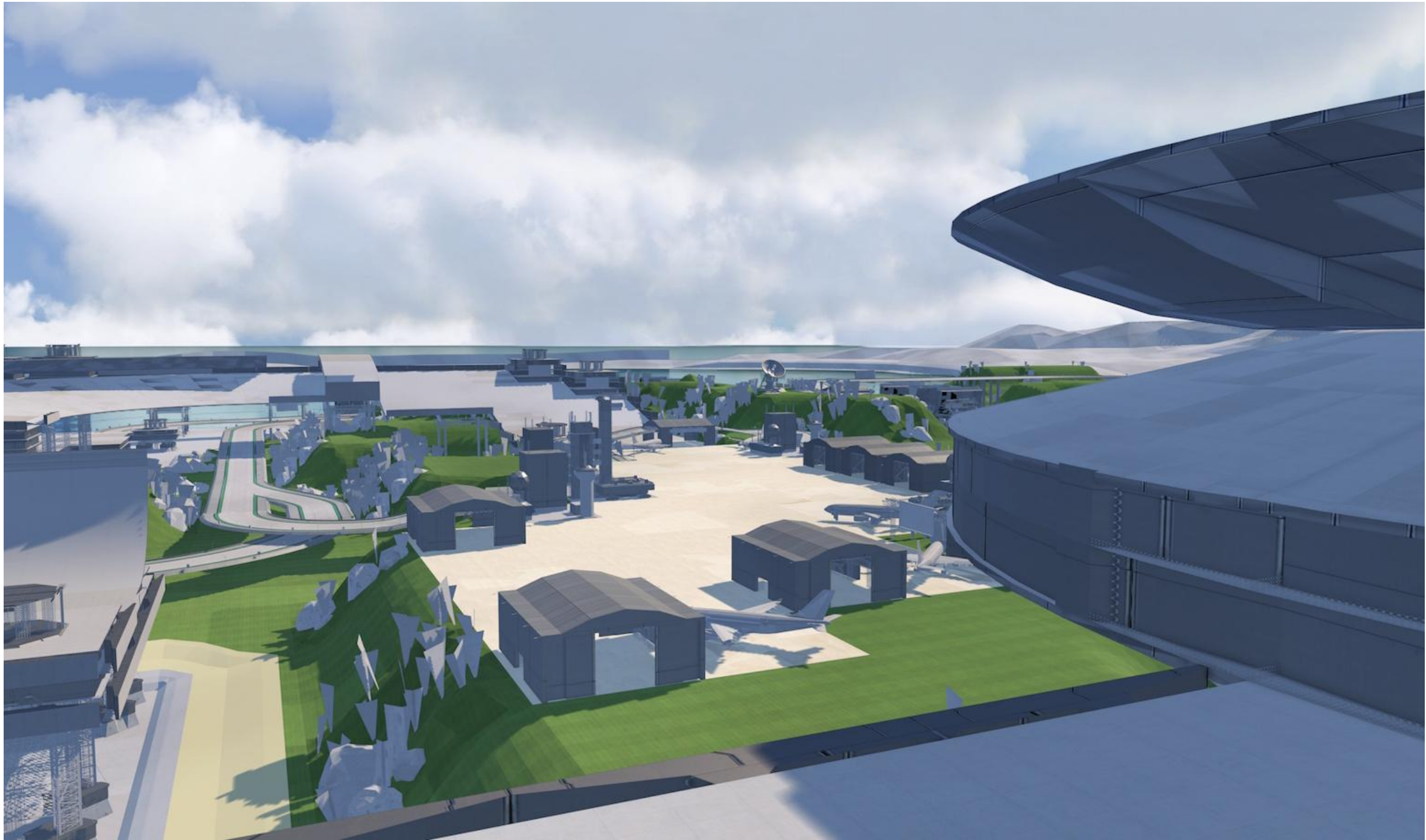
Ground

Mesh: Stadium\Media\Prefab\RoadBump\DiagLeftStartCun

> (DiagLeftStartCurve2In_Air.Prefab.Gbx)

DiagLeftStartCurve2In_Air.Prefab.Gbx







Under construction, lad. This project aims to go live in 2025.

In the meantime, you can check these subprojects:

- [explorer.gbx.tools](#)
- [3d.gbx.tools](#)
- [io.gbx.tools](#)
- [nc.gbx.tools](#)
- [uotd.gbx.tools](#)
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Replay Validation

Replay operations

Replay Time 0:17.36

View

Edit

Validate

Export to validate

Play

Bench

Shoot video

Back

Replay operations

Replay Time 0:17.36

View

Edit

Validate

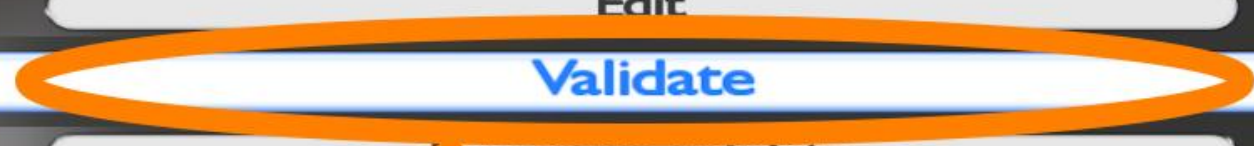
Export to validate

Play

Bench

Shoot video

Back



This replay is valid.

Ok

REPLAY OPERATIONS

 riolu

 C13

 0:29.47

CampaignSolo

SIMPLE EDITOR

ADVANCED EDITOR

SHOOT VIDEO

VIEW

PLAY

BENCH

VALIDATE

EXPORT TO VALIDATE

CONCATENATE REPLAYS

BACK

REPLAY OPERATIONS

 riolu

 C13

 0:29.47

CampaignSolo

SIMPLE EDITOR

ADVANCED EDITOR

SHOOT VIDEO

VIEW

PLAY

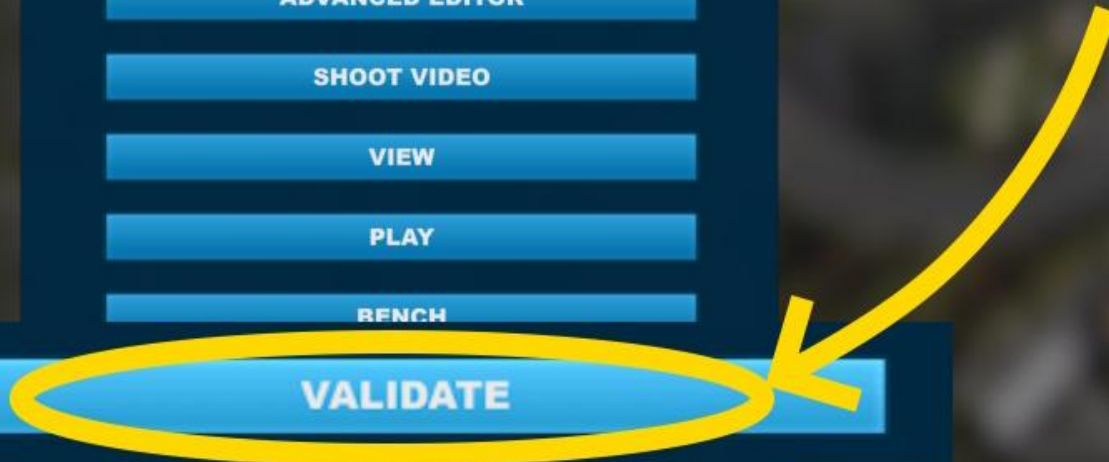
BENCH

VALIDATE

EXPORT TO VALIDATE

CONCATENATE REPLAYS

BACK



EDIT REPLAY

Winter 2024 - 20 - CarDesert_BigBang1112_11-06-2024_19-46-08(00'48"730)

SHOOT

VIEW

EDIT

BACK



SELECT



BACK



EDIT REPLAY

Winter 2024 - 20 - CarDesert_BigBang1112_11-06-2024_19-46-08(00'48"730)

SHOOT

VIEW

EDIT

BACK



SELECT

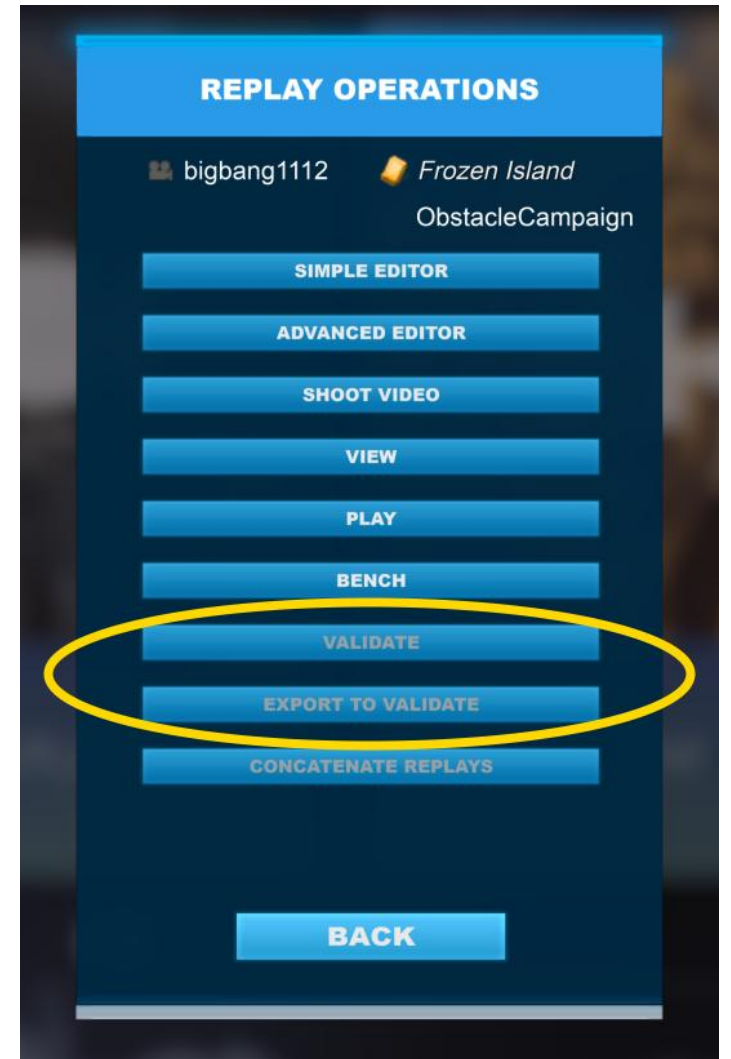


BACK



Why not in Trackmania 2020?

- Theories:
 - Based on ShootMania „sub-engine“
 - **Support for multiple start blocks** (Royal!)
 - Pickup items
 - Collisions
 - It was never implemented
 - (or so we thought)



Why is validation important?

- Detects vehicle physics tweaks
- Detects map edits
- Ensures determinism – same inputs give the same result
- Existed since 2003!

„BUT you can spot these bad replays right away! Why bother?“
Why do I have to see cheaters in games?

Discovering TM2020 validity

- In September 2022 (announced in Decemeber)
 - **Inputs found to be available in TM2020 replay files**
 - Not encrypted, just stored differently

*If there are specialized Trackmania inputs stored in replay files,
then there must be something to validate it against.*

In 2023, Auris discovered that TM2020 has a functioning validation command



Aurimas ⚡ SPLT 10.04.2023 20:36


Hey, did you know about a launch argument `/validatepath=folder` for tm games? Apparently it works for tm2020 as well... It can generate a `ValidateLog.txt` file and by its contents I could tell that tm2020 has validation system and it actually works... I thought it didnt exist? The log does say which replays are valid/invalid. Tested some new replays, they all seem to be valid. Tested some old replays, which should be invalid due to physics changes, they are all invalid. So seems like it works????

Anyways.. the point is that by our current knowledge, the inputs in replay files are truncated from +-65k range to +-128 range... how can they be validated??? 🤔

Also working for dedicated servers



Aurimas  18.04.2023 18:27

back to the /validatepath thing.... So apparently it also works for trackmania dedicated server .exe, so from now on ill be using that since faster loading, ghidra can actually finish analyzing it, + more launch options 

```
TrackmaniaServer.exe /validatepath=test /dedicated_cfg=dedicated_cfg.txt  
/game_settings=MatchSettings/example.txt /verbose_rpc_full /outfile=test1.txt > test2.txt
```

and apparently > test2.txt here actually does something.. (compared to trackmania.exe which doesnt, but i might have just missed something idk)

```
[  
{  
  "ValidatedResult" : {  
    "NbCheckpoints" : 4,  
    "NbRespawns" : 0,  
    "Time" : 31374,  
    "Score" : 0  
  },  
  "IsValid" : true,  
  "DeclaredResult" : {  
    "NbCheckpoints" : 4,  
    "NbRespawns" : 4294967295,  
    "Time" : 31374,  
    "Score" : 0  
  },  
  "Inputs" : "67C8E27C7E169C6E35C271D19C7D25C7D27C6E45C19E5C8D91C20E12C8E16C257D2C209E5C158E61C14E33C9E49C9D",  
  "GameBuild" : "Trackmania date=2022-12-20_13_07 git=116076-a4884c8195d GameVersion=3.3.0",  
  "AccountId" : "1def9b7f-7da6-412c-9d9b-6f3065e95638",  
  "Login" : "He-bf32mQSydm28wZelWOA",  
  "MapUid" : "b3Yt2pzUiTWN20L32Re5x2bfMJ8",  
  "FileName" : "AurisTFG_Short #01_PersonalBest_TimeAttack.Replay.Gbx"  
},  
]  
{
```


What makes replays valid?

- **Simulation of inputs** => same results as replay metadata
- Validation executed on a trusted (unmodified) game build
- Physics modification **should** invalidate legitimate replays
- Driven in real time? *Not really... but there was an attempt!*

TM2020 validation is weird

Was 2021 invalid?

- In Winter 2021, validation slightly broke...

```
----- 98 replays parsed -----  
Can't load :    0% (  0)  
Incompatibl:    0% (  0)  
Is Invalid  :    1% (  1)  
Is Valid   :   92% ( 91)  
Wrong Simu  :    6% (  6)  
Is Puzzle   :    0% (  0)  
0:00:14 total elapsed, 0:00:00 elapsed per validation
```

Winter 2021 - 01: Top 100 ghosts

- In Spring 2021, validation broke a lot...

```
----- 71 replays parsed -----  
Can't load :    0% (  0)  
Incompatibl:    0% (  0)  
Is Invalid  :    2% (  2)  
Is Valid   :   33% ( 24)  
Wrong Simu  :   63% ( 45)  
Is Puzzle   :    0% (  0)  
0:00:27 total elapsed, 0:00:01 elapsed per validation
```

Spring 2021 - 01: Top 100 ghosts

For comparison: **Fall 2020 - 01**

```
----- 92 replays parsed -----  
Can't load :    0% (  0)  
Incompatibl:    0% (  0)  
Is Invalid :    0% (  0)  
Is Valid      : 100% ( 92)  
Wrong Simu :    0% (  0)  
Is Puzzle    :    0% (  0)  
0:00:08 total elapsed, 0:00:00 elapsed per validation
```

Walltime as a solution to slow motion?

- In Summer 2021, after the cheating scandal...
 - TM2020 began storing **walltime** (clock/real time) in a replay file
 - Replays are valid again!

```
----- 65 replays parsed -----
Can't load : 0% ( 0)
Incompatibl: 0% ( 0)
Is Invalid : 0% ( 0)
Is Valid   : 98% ( 64)
Wrong Simu : 1% ( 1)
Is Puzzle  : 0% ( 0)
0:00:09 total elapsed, 0:00:00 elapsed per validation

Trackmania date=2021-07-08_19_39 git=105498-6b9a5dfdeb8 GameVersion=3.3.0 : valid/invalid (54/0) = 100%
Trackmania date=2021-08-11_17_04 git=105549-0ade814a264 GameVersion=3.3.0 : valid/invalid (7/0) = 100%
Trackmania date=2021-07-02_16_36 git=105439-9db96feebfc GameVersion=3.3.0 : valid/invalid (0/1) = 0%
Trackmania date=2021-08-25_15_46 git=105579-4e514be36c2 GameVersion=3.3.0 : valid/invalid (2/0) = 100%
Trackmania date=2021-07-06_18_45 git=105475-a8c47aa558b GameVersion=3.3.0 : valid/invalid (1/0) = 100%

Summer 2021 - 01 : valid/invalid (64/1) = 98.4615%

9a428d5e-5ed3-4ff6-ad82-815bd824f0e7: always valid (1)
4a983dc3-a938-4564-8a1c-8be20779f069: always valid (1)
304adf00-90f1-4a73-8494-ce5210689a1d: always valid (1)
694721bc-8f96-4fdc-951c-5c7ecfb46b2b: always valid (1)
eb8d16c1-f55f-4c6f-86db-fda60a5991ae: always valid (1)
2a13aa7d-992d-4a7c-a3c5-d29b08b7f8cb: always valid (1)
b6501d2e-da63-46c8-878d-c8004ef563bd: always valid (1)
4906ca34-6d0b-47f1-9c27-57c815ae8e2a: always valid (1)
cd32b288-a361-483a-9c48-68417eb83c74: always valid (1)
a198e640-779a-47c0-97b5-9d38a351e7fa: always valid (1)
```


Walltime as a solution to slow motion?

- 32bit timestamps!!! TM2020 will break in 2038...
- I compared race time with walltime just to see...
- ~5% of runs had broken walltime
- Format: [map+player] [race time] [walltime]

```
0:23.430 5:06.000
0:23.356 1:25.000
0:23.356 0:31.000
0:23.571 2:05.000
0:23.574 3:03.000
0:25.345 0:32.000
0:25.538 2:15.000
0:25.562 0:58.000
0:16.522 1:31.000
0:25.571 30743:22:28:00.000
0:25.610 30733:11:45:53.000
0:25.583 30807:18:51:50.000
0:25.602 30769:09:10:51.000
??Personal best 0:24.187 30808:11:16:14.000
0:24.155 2:08.000
0:24.194 1:04.000
0:24.191 30718:16:41:28.000
0:29.173 0:39.000
0:29.207 30722:02:44:48.000
0:29.504 2:36.000
```

Loupphok Spring 2022 – 21 0:57.631 1:08.000

84.3% game speed!

WirtualTM Summer 2021 – 20 0:52.962 1:13.000

72.5% game speed!

(something might not work here...)

Spring 2023+

- Validation has stabilized
- ~1% of runs still have broken walltime

```
Spring 2025 - 01 0:23.507 0:28.000 1,39 %  
Spring 2025 - 01 0:23.555 0:41.000 0,84 %  
Spring 2025 - 01 0:23.555 0:32.000 1,23 %  
Spring 2025 - 01 0:23.557 0:50.000 1,56 %  
Spring 2025 - 01 0:23.653 0:00.000 0,66 %  
Spring 2025 - 01 0:23.658 0:40.000 0,75 %  
Spring 2025 - 01 0:23.670 0:39.000 0,77 %  
Spring 2025 - 01 0:23.673 0:30.000 0,85 %  
Spring 2025 - 01 0:23.678 0:00.000 0,92 %
```

**How to bring validation to
players again?**

Dedicated servers for validation I/O?

- **/validatepath**
- The only available way in TM2020
- Works for TM2 as well
- Not working:
 - TMForever – not available on dedicated servers
 - TMTurbo – no dedicated servers

So how to unify it and make it usable?

REVALIDATE



REVALIDATE

Welcome to Revalidate!

Drag & Drop replays, ghosts, and maps

3 requests/h, max 10 files, max 8 MB each

Validate

Why multiple Linux distributions?



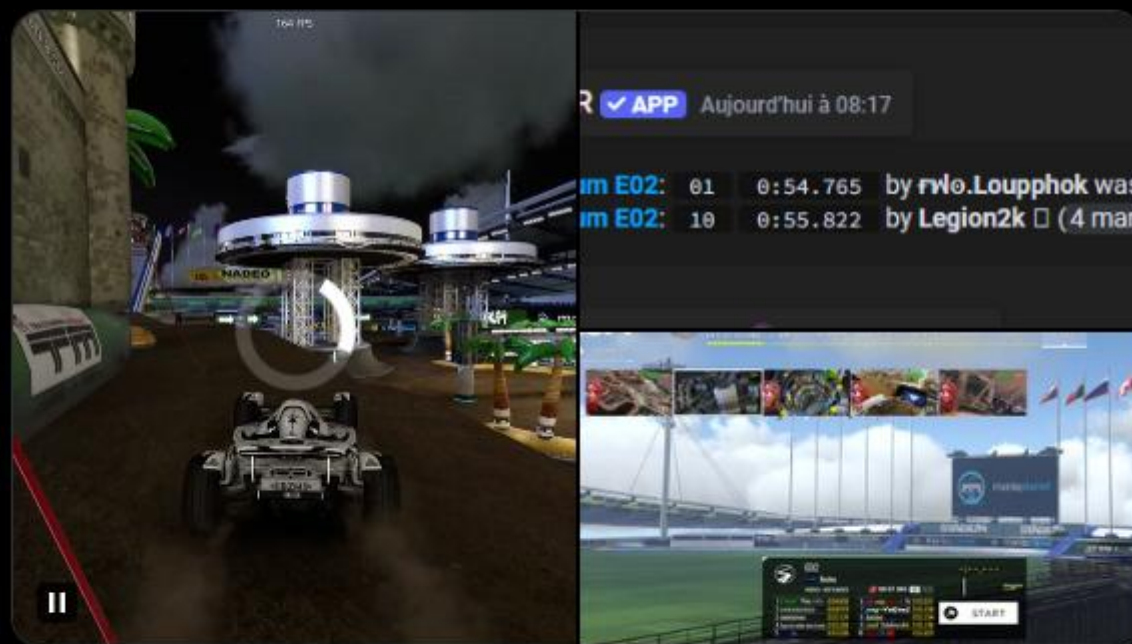
  **Loupphok**

@Loupphok

Today I wake up with one of my TM² Stadium WR being DELETED????
[@Trackmania](#) ??? This is E02 – 54.765 driven on 27/06/2024 PLEASE
explain

First time this EVER happens to me

[Přeložit post](#)



9:13 dop. · 30. 6. 2024 · **8 700** Zobrazení



8



10



100




2



Long story short

- Nadeo automatically validates Top 10 in Trackmania 2
- Loupphok's run was invalid only on some Linux distros
 - One of which Nadeo uses (*Ubuntu 14*)
- Mystixor found a **bug in the atan2f() function of glibc library**
 - **The bug was 30+ years old, fixed just about a year ago in glibc 2.40**



 **Mystixor** I guess the only way to truly confirm this is the cause would be to find the exact call to one of these functions that returns a different value from the previous versions

Mystixor  13.08.2025 5:56

Found and confirmed. The reason why Loupphok's E02 run is invalid is because of one specific call to `atan2f(y, x)` (computing the arc tangent of y / x) at exactly 0.850 seconds into the run, at memory address `ManiaPlanetServer + 0xE0F71F`. The correct result both on Windows as well as Linux when using glibc 2.41 and later is `0x3FCB62DB`, and the invalid run instead shows `0x3FCB62DA`. Both represent a floating point number of roughly `1.58895`. At first sight it may seem obvious that this hexadecimal value being off by one would lead to desync, however there are other values produced by trigonometric functions that are also off by one, some even more than this, but none of them cause any problems. It's only this single one.



I hooked the atan2f function and if I manually insert just this one single value and leave everything else alone, it's enough to validate the run



REVALIDATE

Welcome to Revalidate!

Drag & Drop replays, ghosts, and maps

3 requests/h, max 10 files, max 8 MB each

Validate

E02_ꠑꠓ.Loupphok(0'54"765).Ghost.Gbx



E02_ꠑꠓ.Loupphok(0'54"765).Ghost.Gbx

A validation result for this replay already exists (SHA-256:
793ffe3fe3198854a02220aa4db9a00f1d5d496315dcde29721ca11fab7eb803).**E02_ꠑꠓ.Loupphok(0'54"765).Ghost.Gbx****Ubuntu 24.04 LTS**

Noble Numbatt

INVALID**Ubuntu 25.04**

Plucky Puffin

VALID**Debian 12**

Bookworm

INVALID**Alpine 3.22**

+ glibc

VALID**Fedora 42****VALID**








General result

Checkpoints


Inputs

Id:	01996dd3-e261-7d26-b6db-4bf7c8905dbf
File name:	E02_ꠑꠓ.Loupphok(0'54"765).Ghost.Gbx
SHA-256:	793ffe3fe3198854a02220aa4db9a00f1d5d496315dcde29721ca11fab7eb803
Status:	Completed
Game:	TM2

What about TMUF (and TMTurbo)?

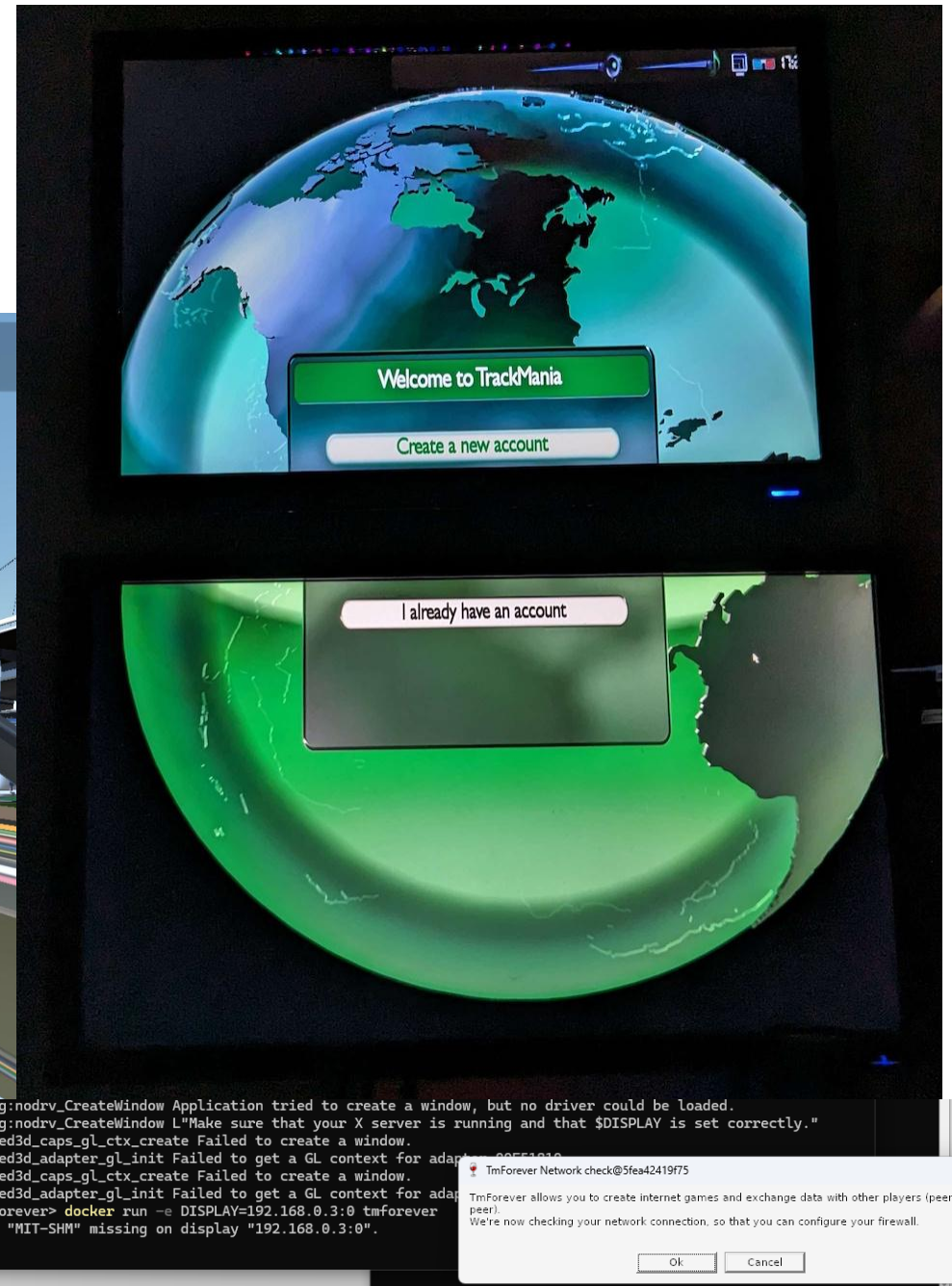
- ✓  Replays
 - >  Autosaves
 - >  CreatedGhosts
 - >  Downloaded
 - >  MediaTrackerGhosts
 -  Test.Replay.Gbx
 -  Test2.Replay.Gbx

 ValidateLog.txt

 lib - user/lib


/home/tmf/TrackMania/ValidateLog.txt

```
1  ----- 2 replays parsed -----
2  Can't load :    0% (  0)
3  Incompatibl:    0% (  0)
4  Is Invalid :    0% (  0)
5  Is Valid  : 100% (  2)
6  Wrong Simu :    0% (  0)
7  Is Puzzle  :    0% (  0)
8  00:00:11 total elapsed, 00:00:05 elapsed per validation
9          bigbang1112: always valid (2)
10
```



revalidate.gbx.tools





ENVIMIX TURBO

COMING NOVEMBER 2025