

Week 6 Progress Report

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OpenFOAM GUI

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Objective of Week 6

Focus: Fix Critical Coefficient Bug

- ◀ All coefficients were written as 0.0
- ◀ Simulations became physically incorrect

Goals

- ◀ Identify root cause (not patch)
- ◀ Fix pipeline end-to-end
- ◀ Verify correct OpenFOAM output
- ◀ Clean corrupted saved data

Week 6 Summary

Component	Status	Outcome
Defaults loading	Fixed	Correct values
PropertyMap handling	Fixed	No data loss
GUI spinboxes	Fixed	Correct UI display
Simulation type	Fixed	Correct RAS/LES/DES
Override saving	Fixed	Clean data
File generation	Working	Correct output

Root Cause Analysis

Key Insight

This was NOT one bug — it was a chain of failures

- ◀ Bugs existed across UI, backend, and writer
- ◀ Each bug amplified the others
- ◀ Result: all coefficients became 0.0

Bugs Identified

#	File	Bug	Fix
1	CaseWriter	Wrong argument	Passed model
2	CaseWriter	PropertyMap not dict	Used dict()
3	UI Panel	Missing setValue()	Added call
4	Models File	No .copy()	Added copy
5	CaseWriter	float() crash	Removed conversion

Chain of Failures

What Actually Happened

- 1 UI showed 0.0 (spinbox not set)
- 2 Wrong values saved as overrides
- 3 PropertyMap failed to convert
- 4 Defaults ignored in merge
- 5 Wrong simulationType used

Result

Entire pipeline produced zeros

Critical Fix (UI Bug)

Missing setValue()

BEFORE (broken)

```
value = saved.get(coeff, defaultVal)
```

AFTER (fixed)

```
value = float(saved.get(coeff, defaultVal))  
spinBox.setValue(value)
```

Impact: Correct values shown in UI

Critical Fix (Merge Logic)

Correct Merge Pipeline

```
defaults = getModelCoefficients(model)
overrides = dict(obj.TurbulenceModelCoeffs)
```

```
merged = defaults.copy()
merged.update(overrides)
```

Impact:

- ◀ Defaults preserved
- ◀ Overrides applied correctly

Files Modified

File	Purpose
CfdCaseWriterFoam.py	Fix pipeline + merge
CfdTurbulenceModels.py	Safe defaults (.copy())
TaskPanelCfdPhysicsSelection.py	UI fixes

Verification Output

Debug Print

```
[TURB] Model      : kOmegaSST  
[TURB] Defaults   : {alphaK1: 0.85}  
[TURB] Overrides  : {}  
[TURB] Merged     : {alphaK1: 0.85}
```

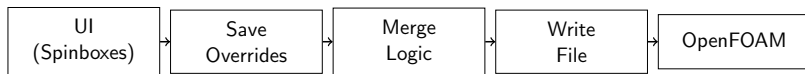
Result: Correct pipeline confirmed

Final Output (Fixed)

turbulenceProperties

```
kOmegaSSTCoeffs
{
    alphaK1 0.85;
    beta1    0.075;
}
```

End-to-End Flow (Fixed)



Key Learnings

- ◀ PropertyMap is NOT a Python dict
- ◀ Always use setValue() in UI
- ◀ Use .copy() for shared data
- ◀ Debug full pipeline, not just one step
- ◀ Saved data can persist bugs

Final Status

- ◀ Bug completely resolved
- ◀ Full pipeline working
- ◀ UI → Backend → OpenFOAM verified

Outcome

Fully functional turbulence system