

**SIT 725**

## **Applied Software Engineering**

**Task 6.2D**

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This document outlines the testing implementation for a Node.js-based UAV Performance Analysis Platform that processes flight data, manages user authentication, and provides data visualization capabilities.

## Unit Testing

4 tests covering data validation, statistics calculation, and flight data processing

**Location:** tests/unit/UAVDataProcessor.test.js

Results:

```
"C:\Program Files\nodejs\npm.cmd" run test:unit

> uav_analysis_platform@1.0.0 test:unit
> jest tests/unit

PASS tests/unit/UAVDataProcessor.test.js
  UAVDataProcessor Unit Tests
    ✓ should validate correct flight data format (2 ms)
    ✓ should reject invalid flight data format
    ✓ should calculate statistics correctly
    ✓ should process flight data correctly (1 ms)

Test Suites: 1 passed, 1 total
Tests:       4 passed, 4 total
Snapshots:   0 total
Time:        1.332 s, estimated 3 s
Ran all test suites matching /tests\/unit/i.

Process finished with exit code 0
```

## Integration Testing

**Location:** tests/integration/auth.test.js & tests/integration/flights.test.js

8 tests covering user registration, login, profile management, and flight data operations.

Results:

```
PASS tests/integration/flights.test.js
Flight Data API Integration Tests
  ✓ should upload and process flight data successfully (324 ms)
  ✓ should get flight history for authenticated user (264 ms)
  ✓ should reject unauthorized requests (257 ms)
  ✓ should get specific flight details (250 ms)

A worker process has failed to exit gracefully and has been force exited.
ind leaks. Active timers can also cause this, ensure that .unref() was ca
Test Suites: 2 passed, 2 total
Tests:      8 passed, 8 total
Snapshots:  0 total
Time:       3.785 s, estimated 5 s
Ran all test suites matching /tests\\integration/i.

Process finished with exit code 0
```

## API Testing

Integrated within tests/integration/auth.test.js & tests/integration/flights.test.js.

HTTP request testing using Supertest library for endpoint validation.  
8 API endpoint tests covering authentication, user management, and flight data operations.

## End-to-End Testing

**Location:** tests/e2e/user-workflow.test.js

**Scenarios:** User registration → login → file upload → data analysis → report generation

```
PASS tests/e2e/user-workflow.test.js
End-to-End User Workflow Tests
  ✓ complete user journey: register -> login -> upload data -> analyze -> generate report (366 ms)
  ✓ should handle invalid file upload gracefully (246 ms)

Test Suites: 1 passed, 1 total
Tests:       2 passed, 2 total
Snapshots:   0 total
Time:        2.25 s, estimated 4 s
Ran all test suites matching /tests\\e2e/i.
```

## Test coverage

File	% Stmts	% Branch	% Funcs	% Lines	Uncovered Line #s
All files	80.58	69.3	95	80.2	
controllers	74.24	61.9	94.44	74.21	
AuthController.js	74.5	72.41	83.33	74.46	28,40,70-71,83,112-125,157
FlightController.js	74.07	52.94	100	74.07	16,32,43,95-101,144-145,163,182-183,201,215-216,234,248-249,267,279-280
middleware	92.3	100	100	92.3	
auth.js	92.3	100	100	92.3	21
models	91.8	78.12	95.23	92.15	
FlightData.js	100	100	100	100	
UAVDataProcessor.js	91.48	80	94.73	89.47	16,21,96,135
User.js	90.9	50	100	100	38
Test Suites: 4 passed, 4 total					
Tests: 14 passed, 14 total					
Snapshots: 0 total					
Time: 4.97 s					