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NASA CR-132372 - Volume II

ANALYTICAL STUDY TO DEFINE A HELICOPTER STABILITY DERIVATIVE EXTRACTION METHOD

VOLUME II - FINAL REPORT (DATA VOLUME)

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Stratford, Conn.

for

USAAMRDL LANGLEY DIRECTORATE

and

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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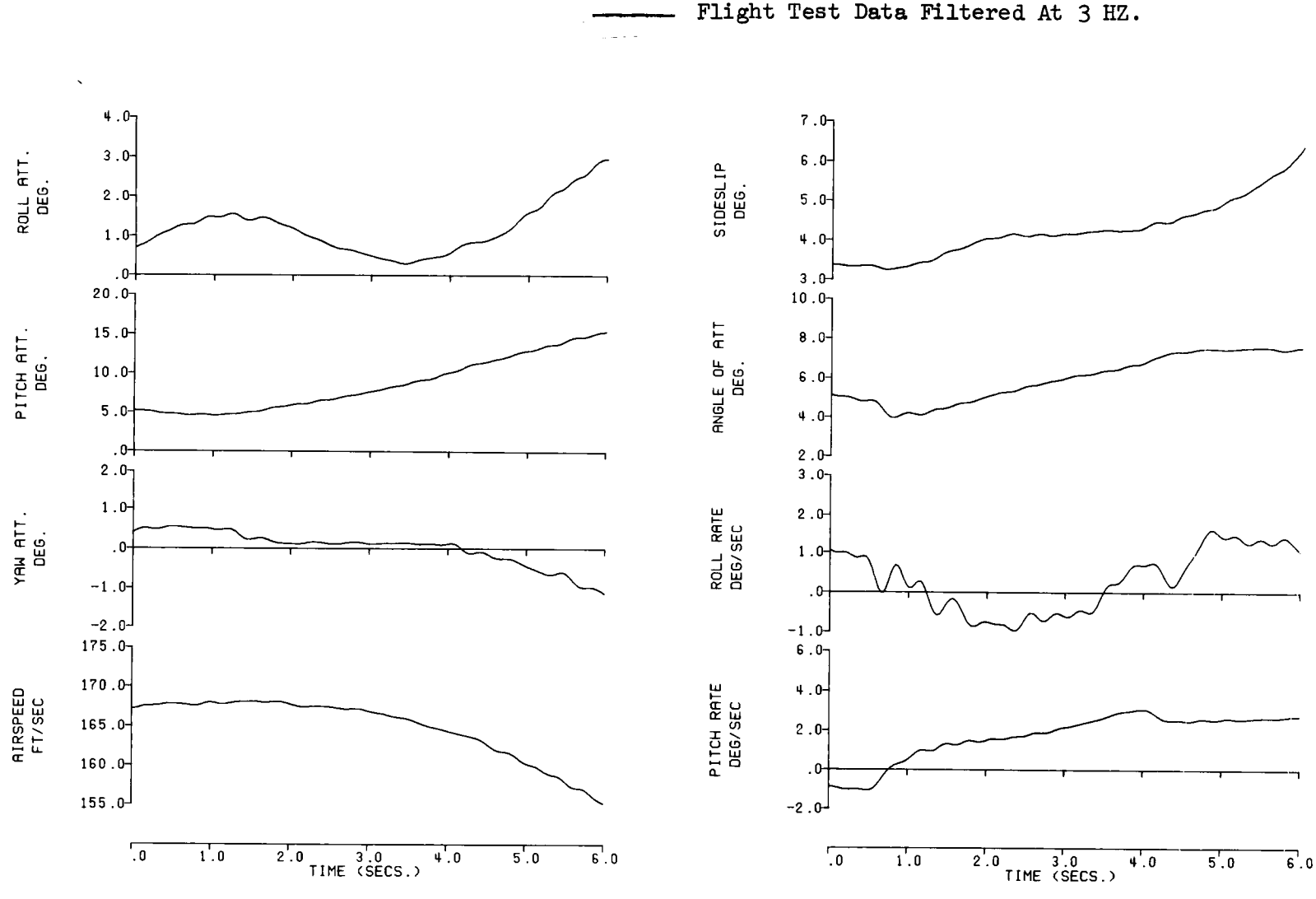
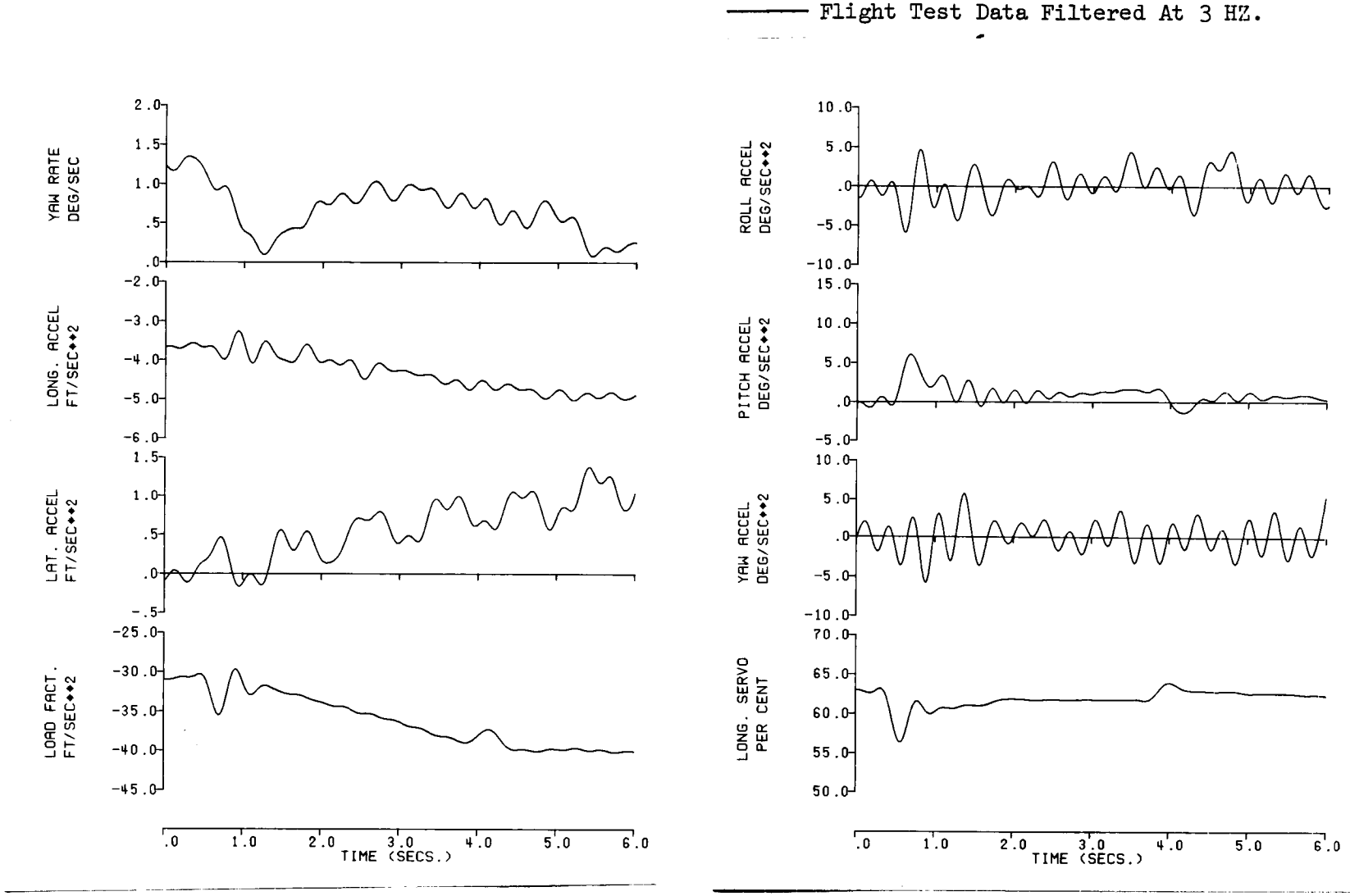


Figure 1. - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (100 knots, Maneuver 1).



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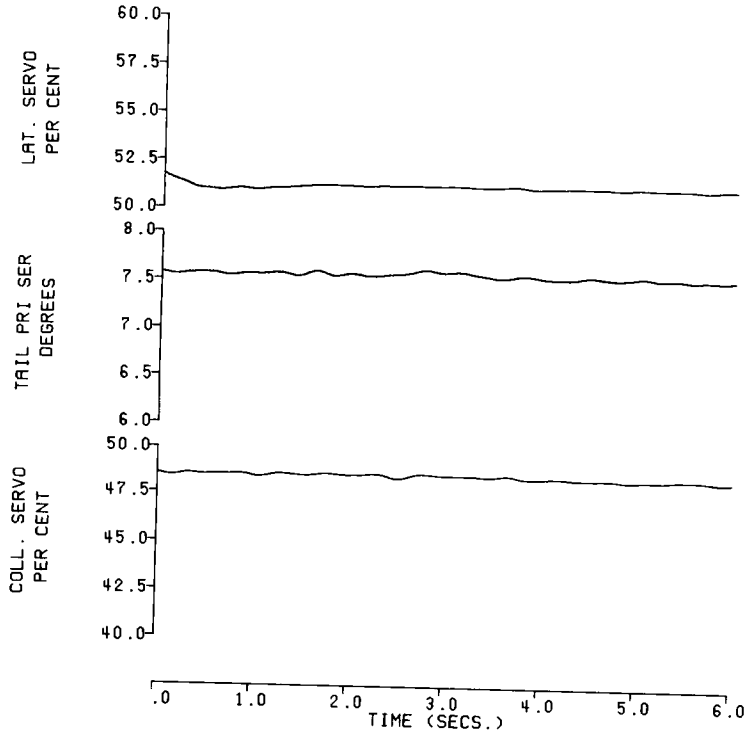

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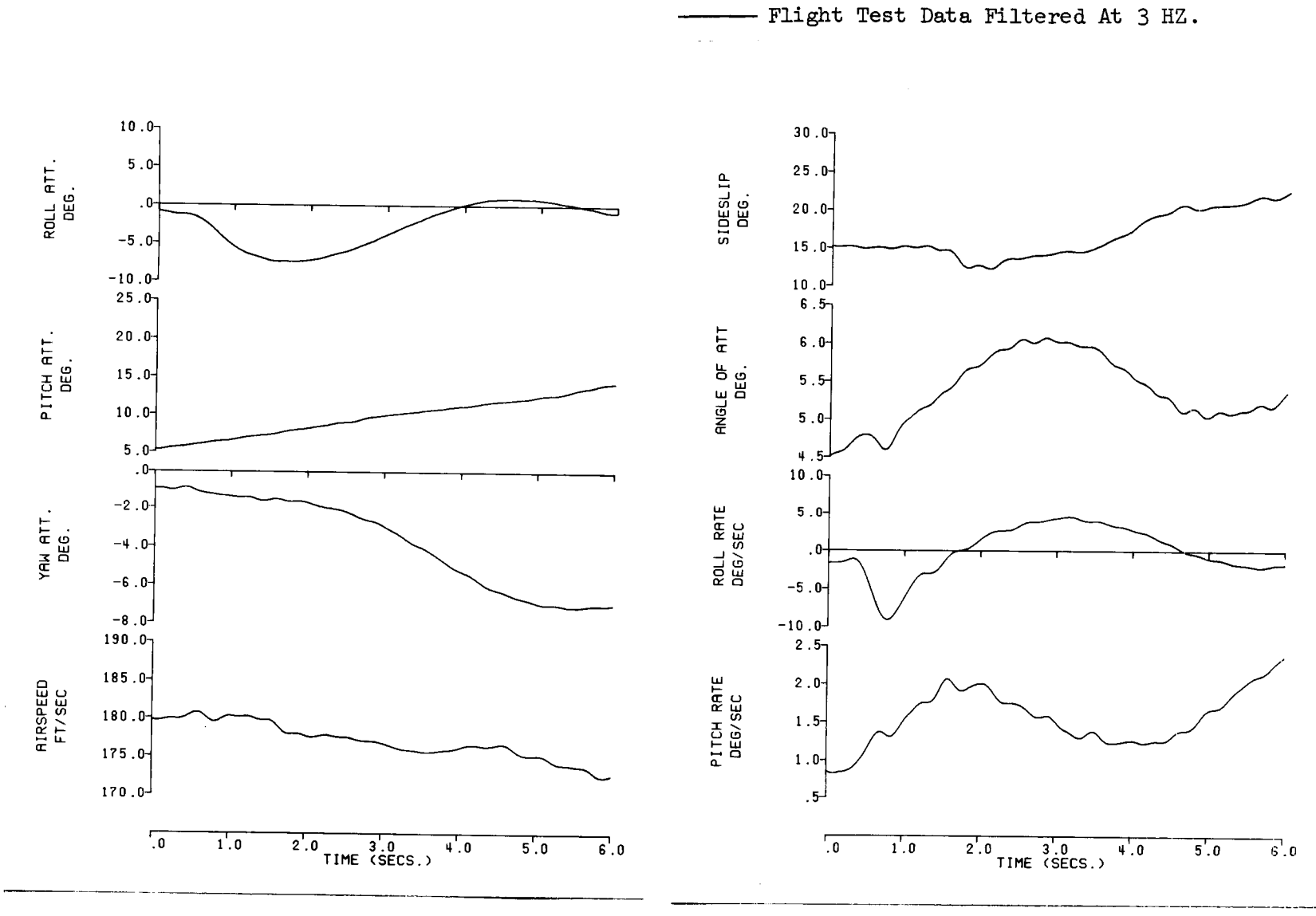

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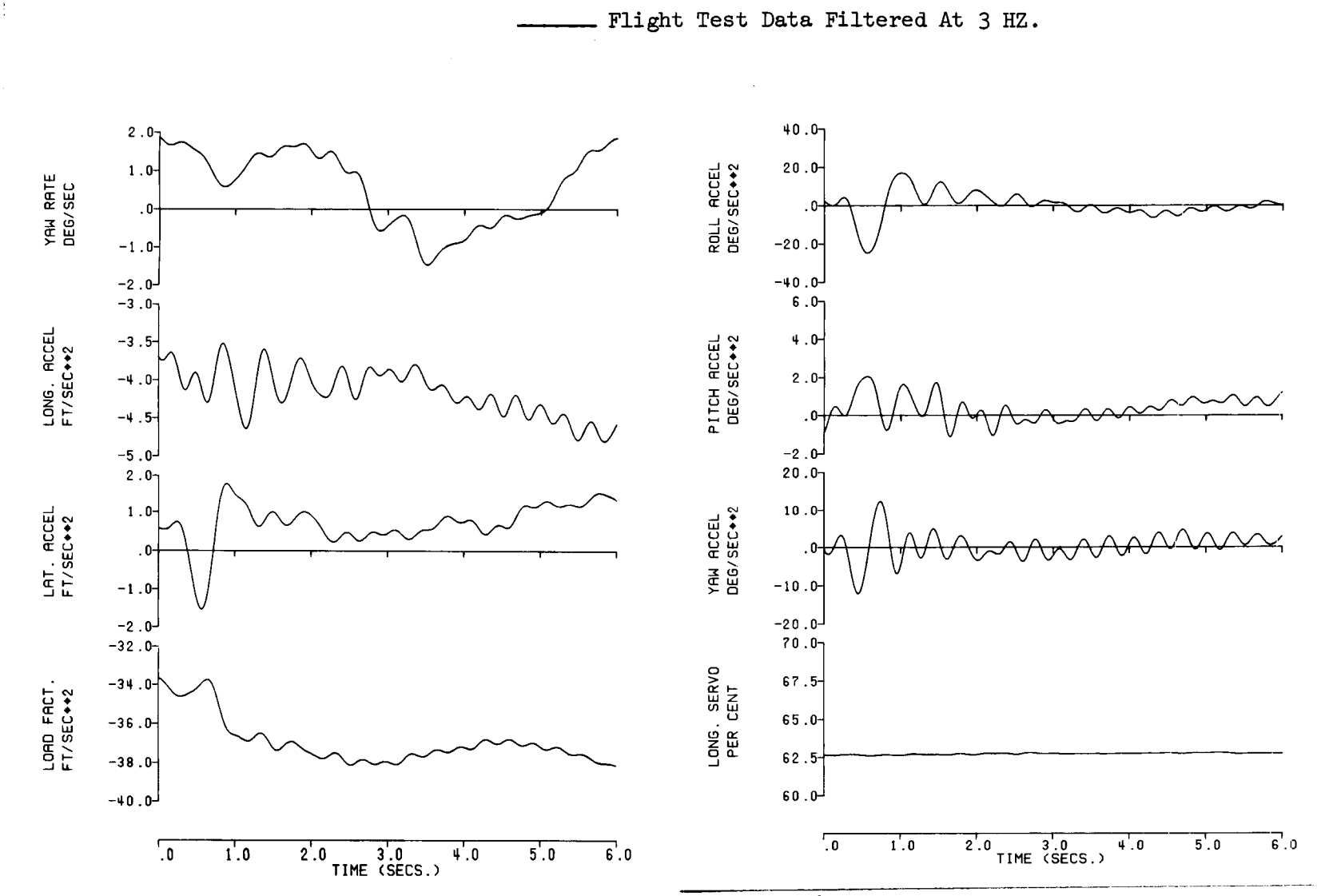

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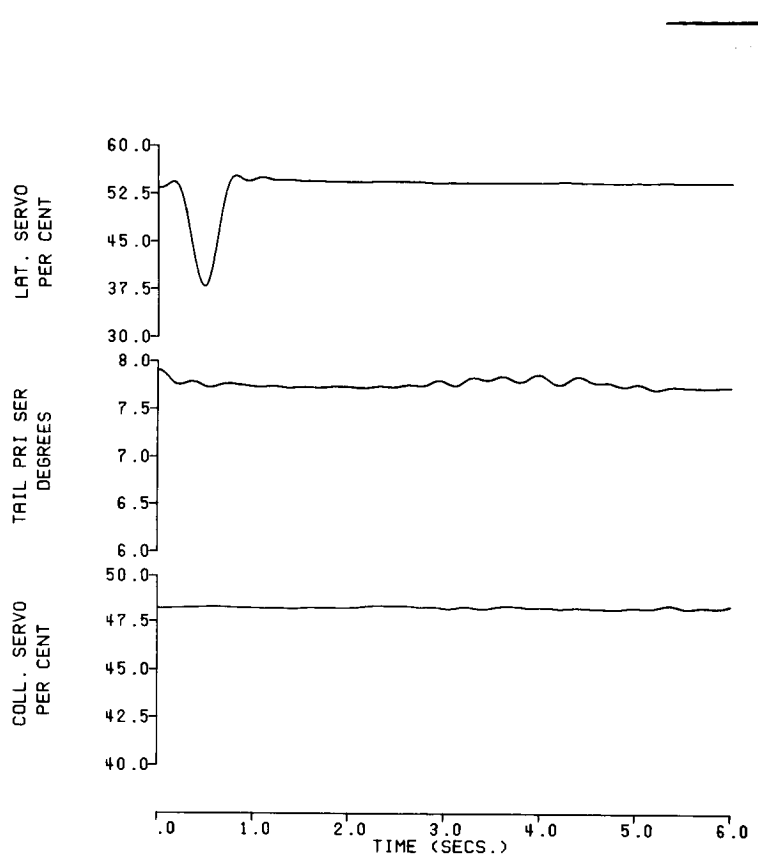

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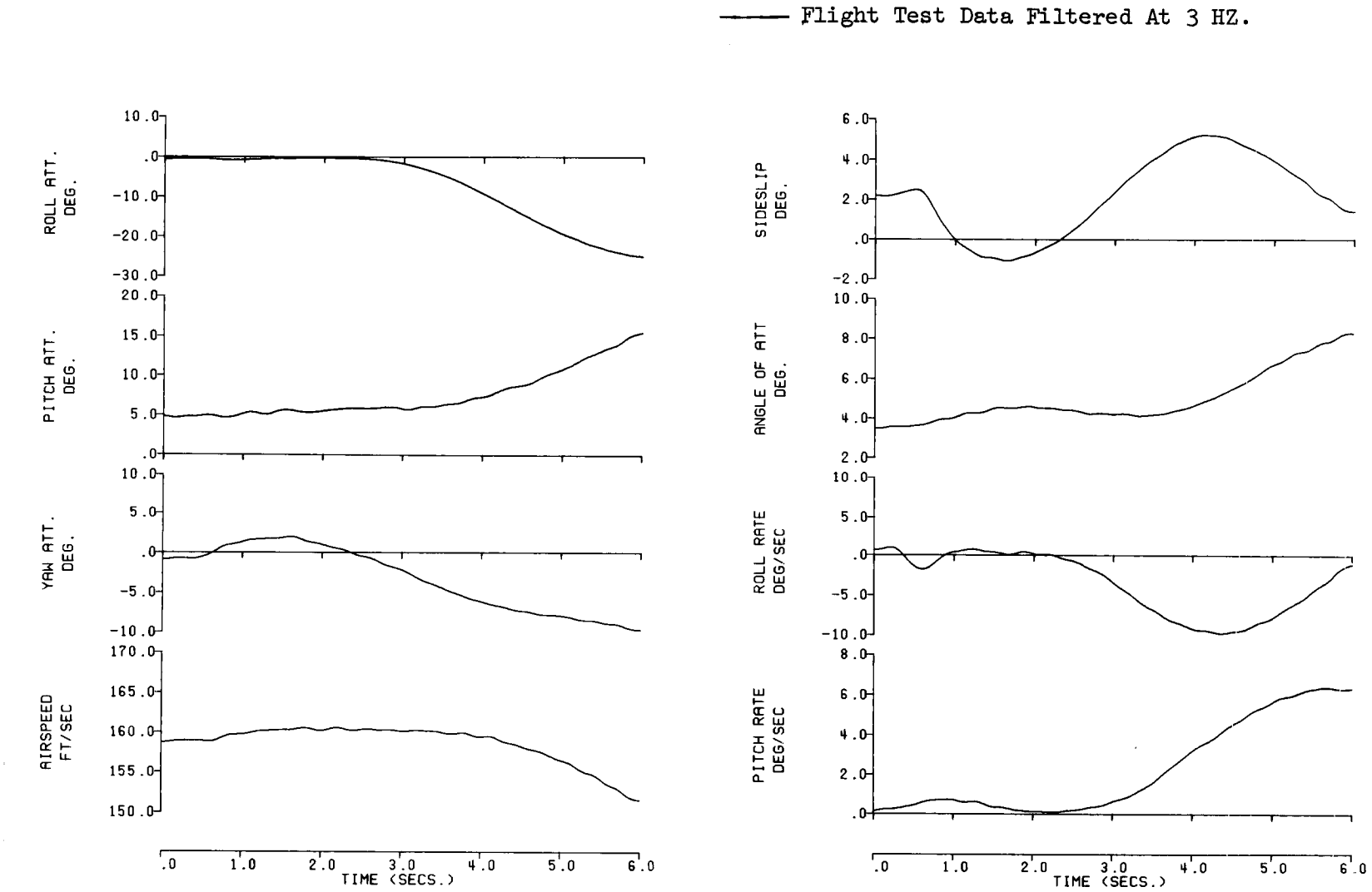

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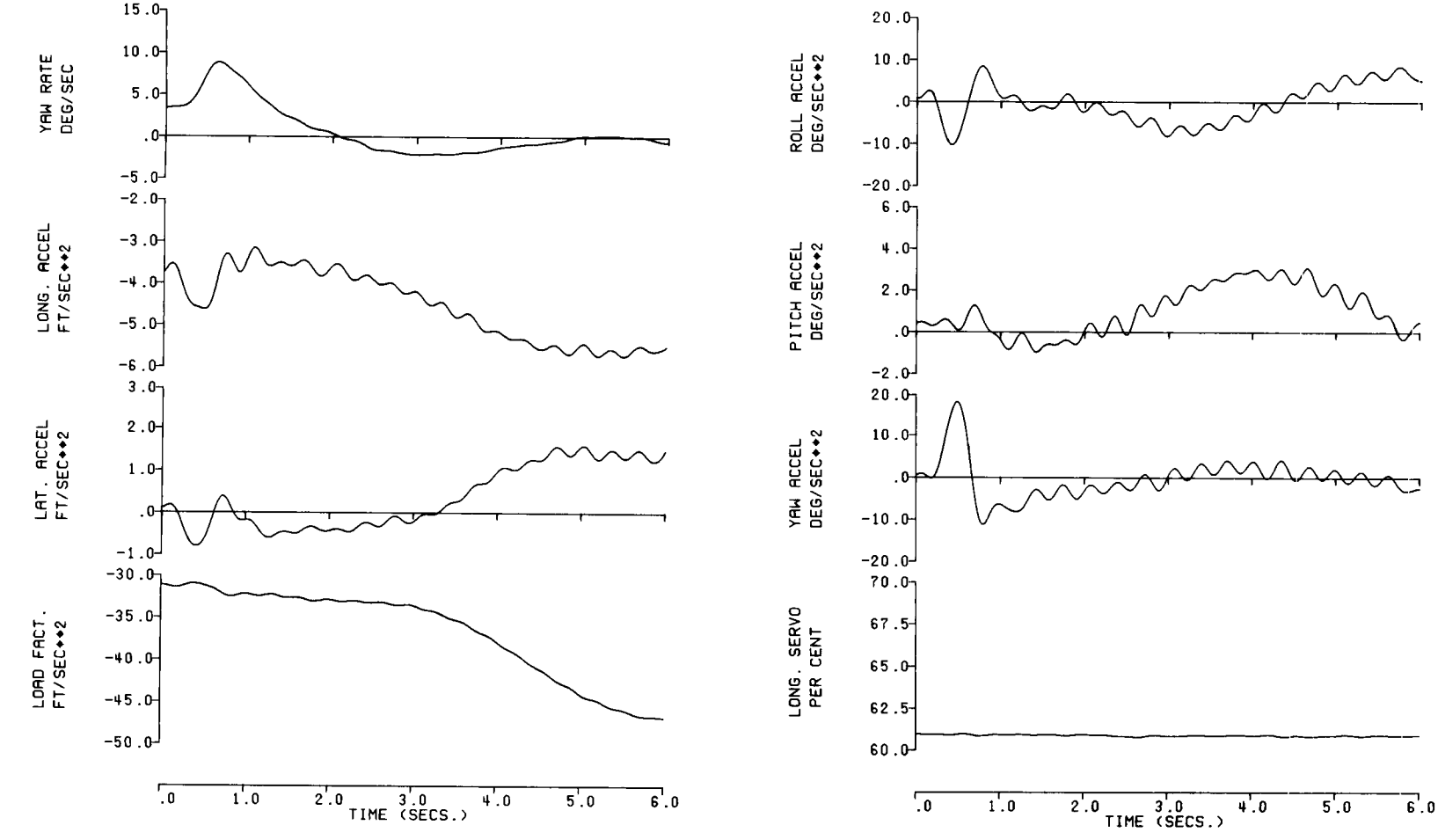

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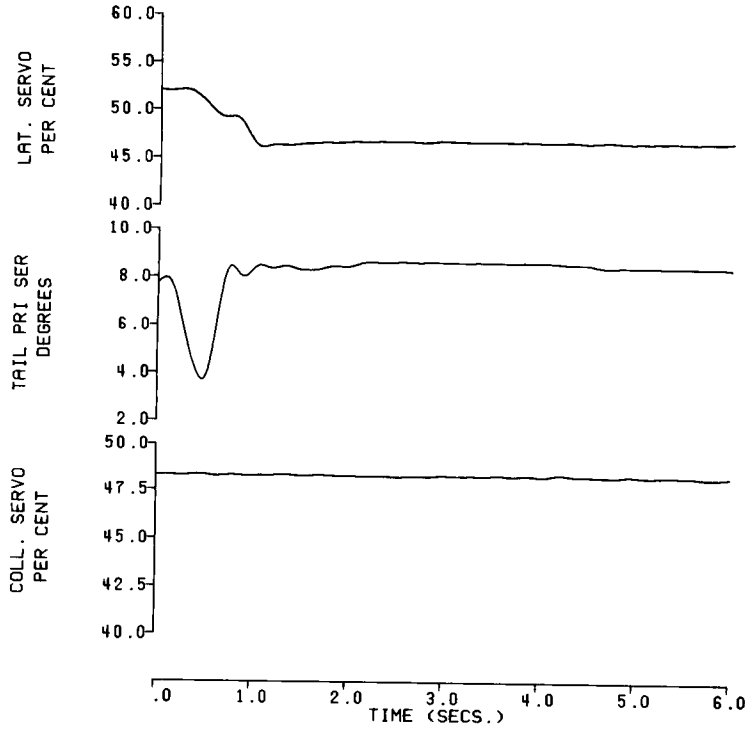

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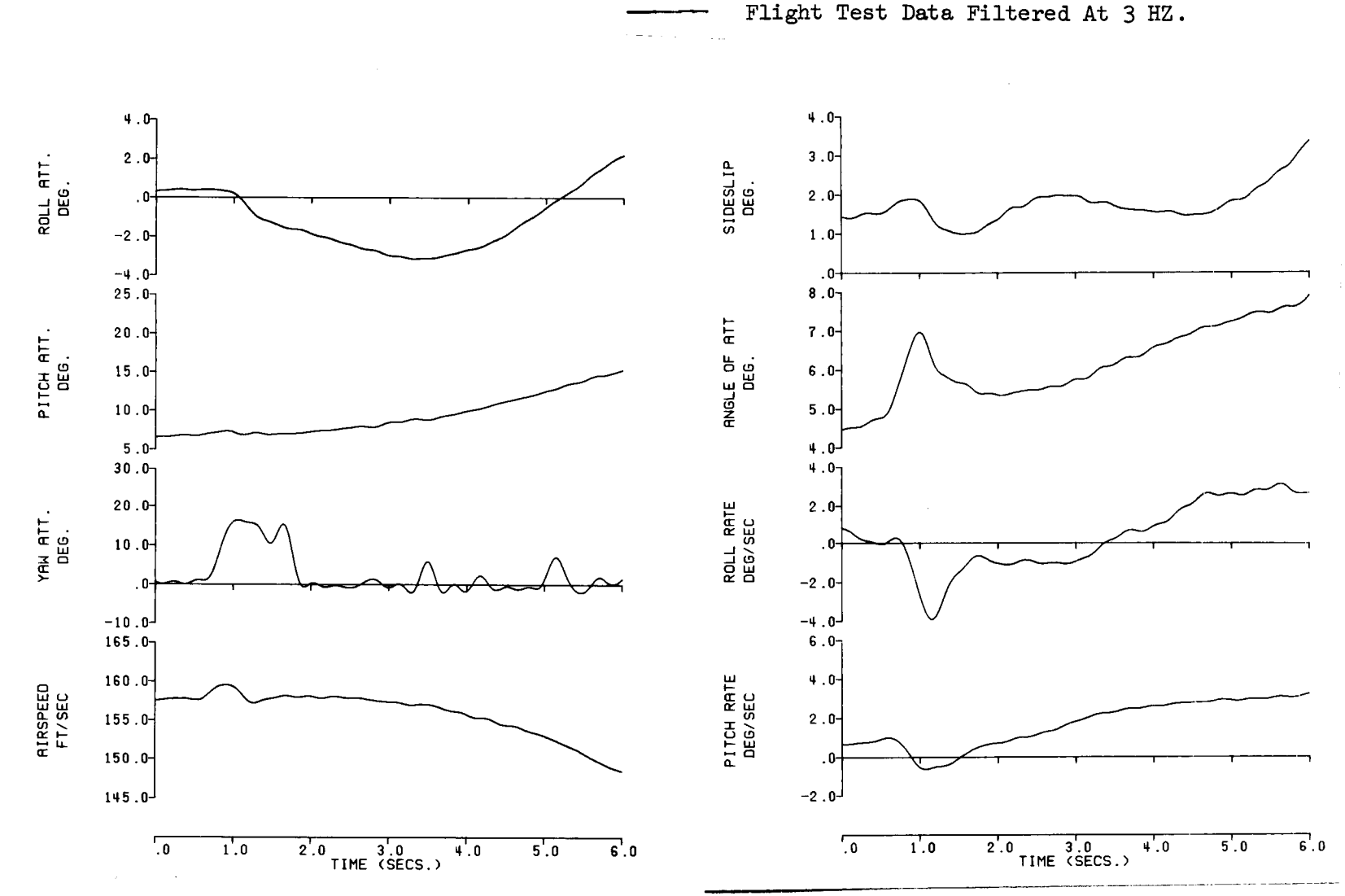
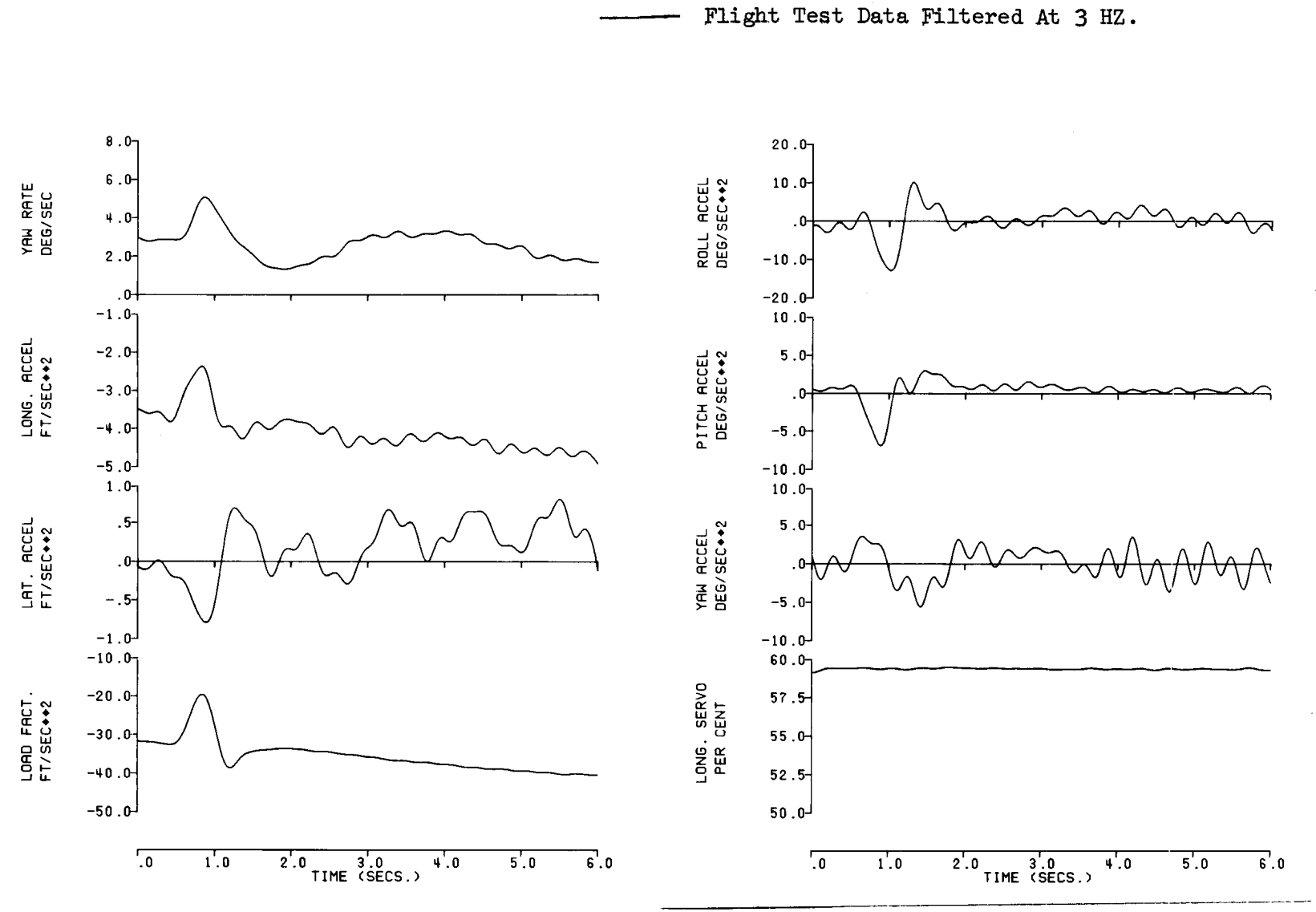


Figure 4. - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (100 knots, Maneuver 4).



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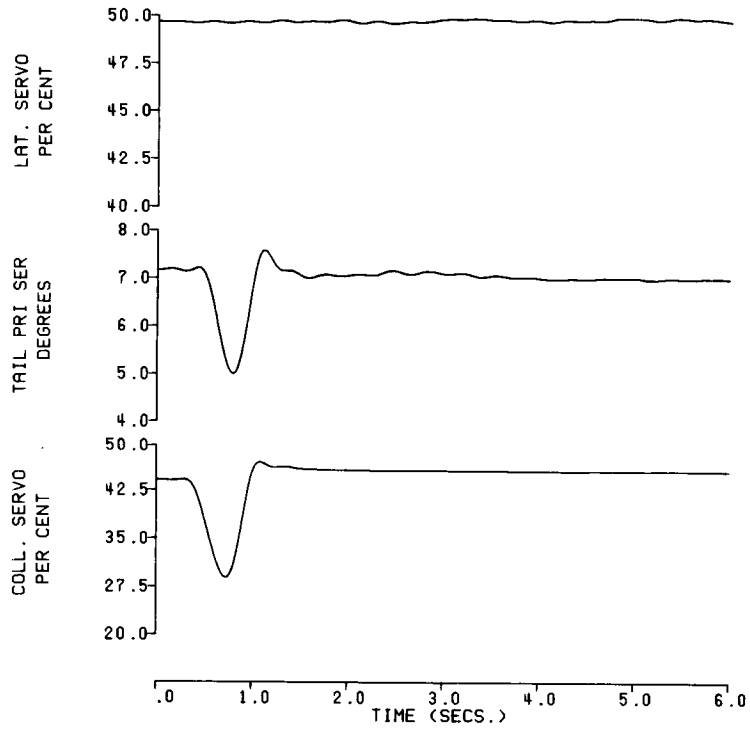
——— Flight Test Data Filtered At 3 HZ.



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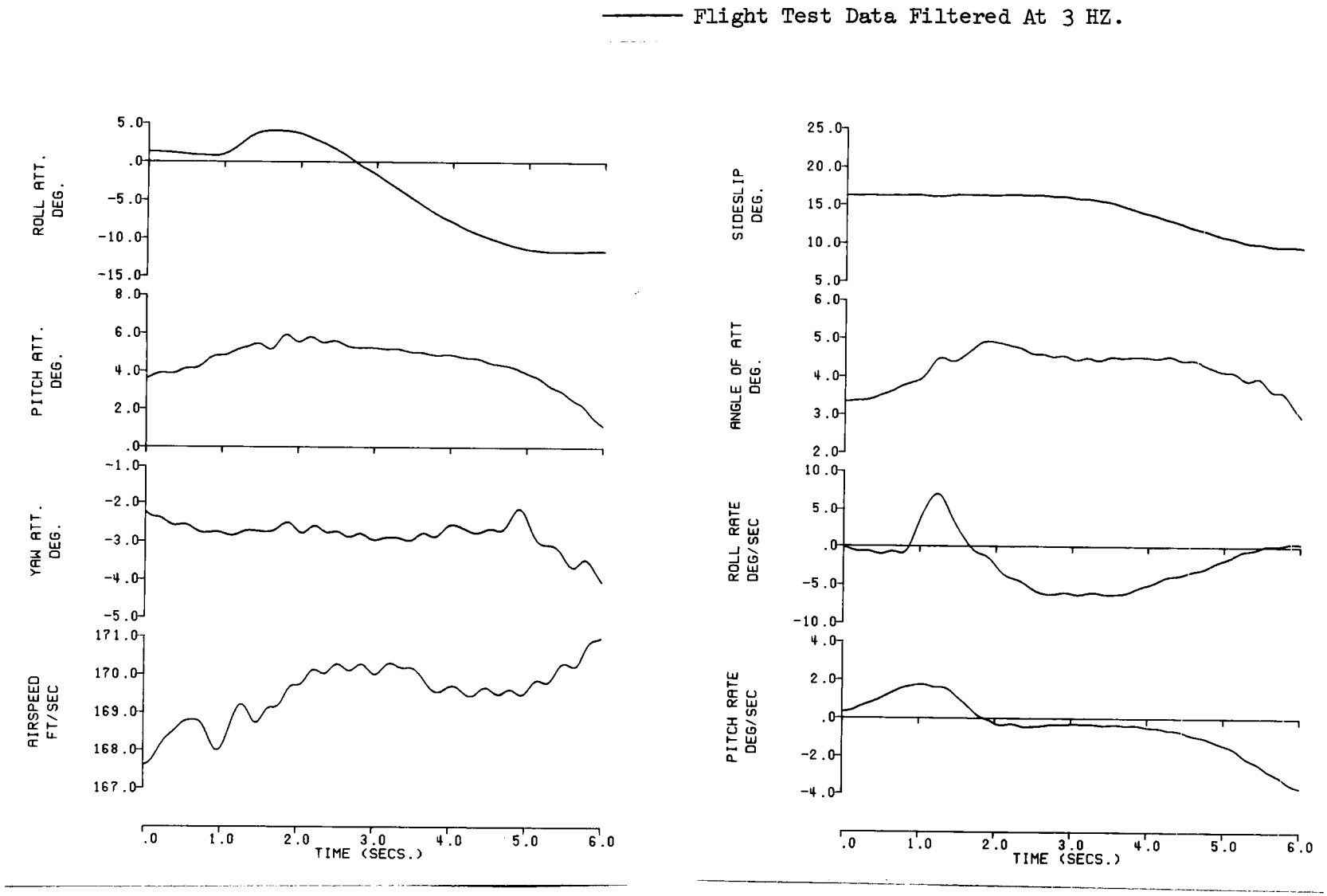
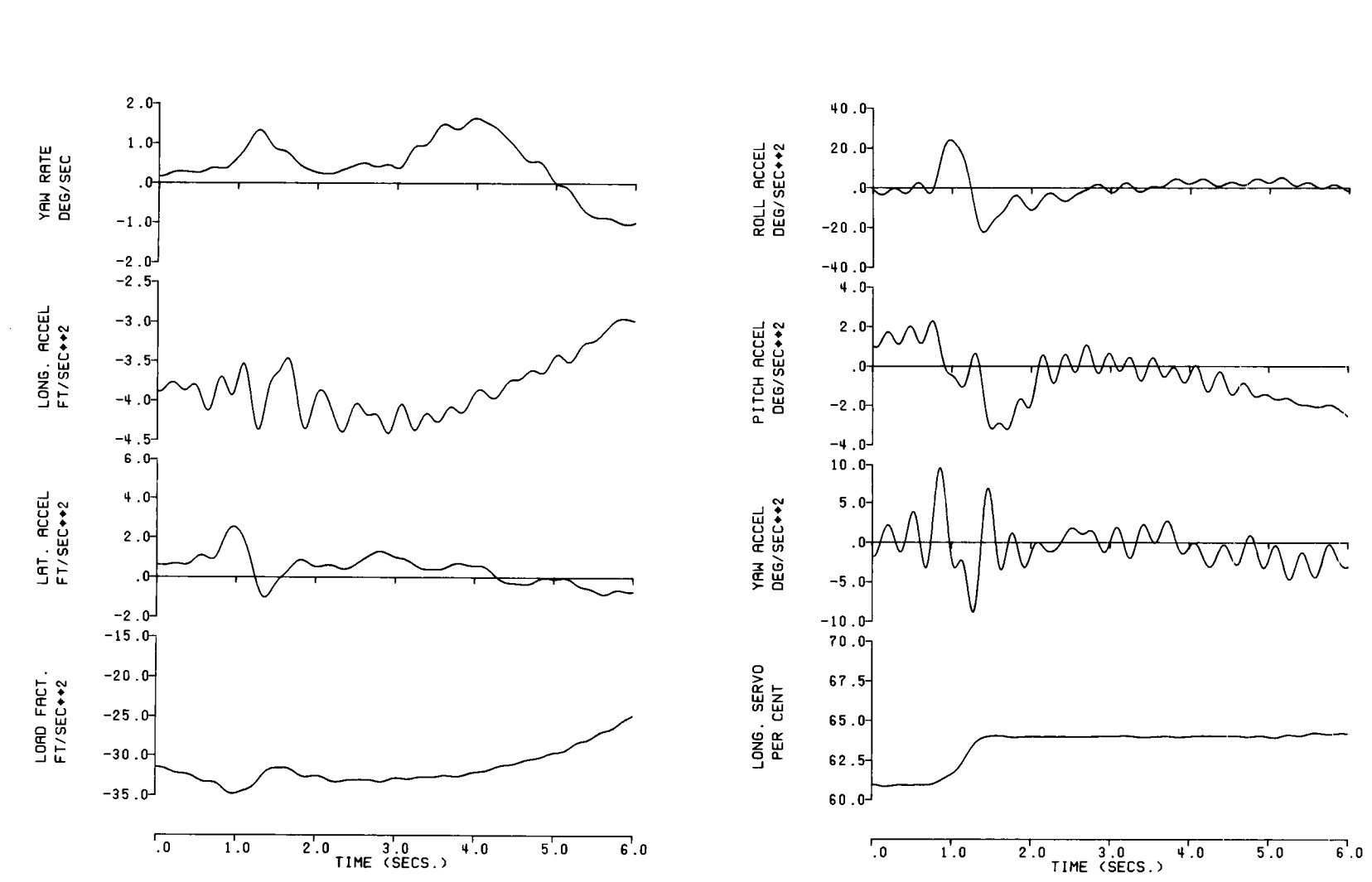


Figure 5 . - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (100 knots, Maneuver 5).



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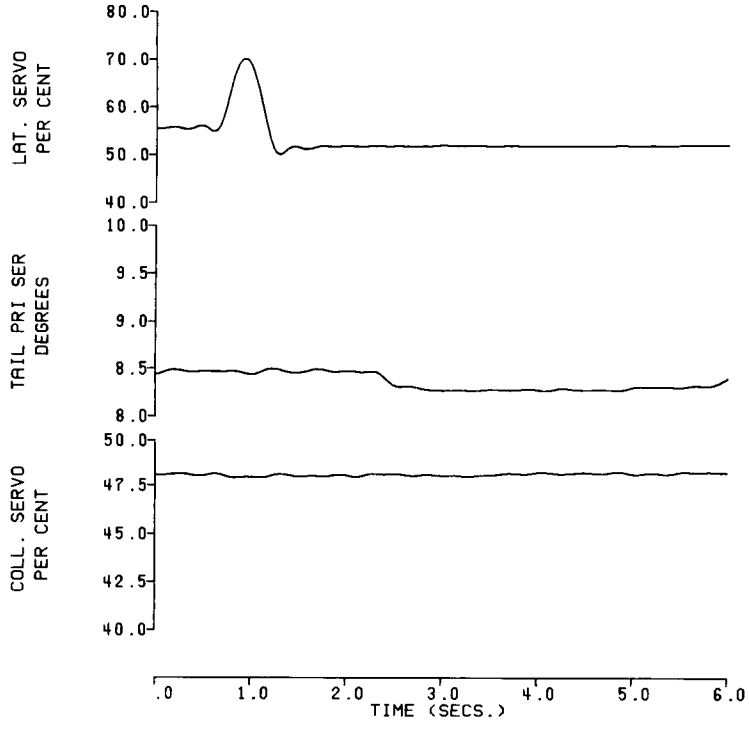
_____ Flight Test Data Filtered At 3 HZ.



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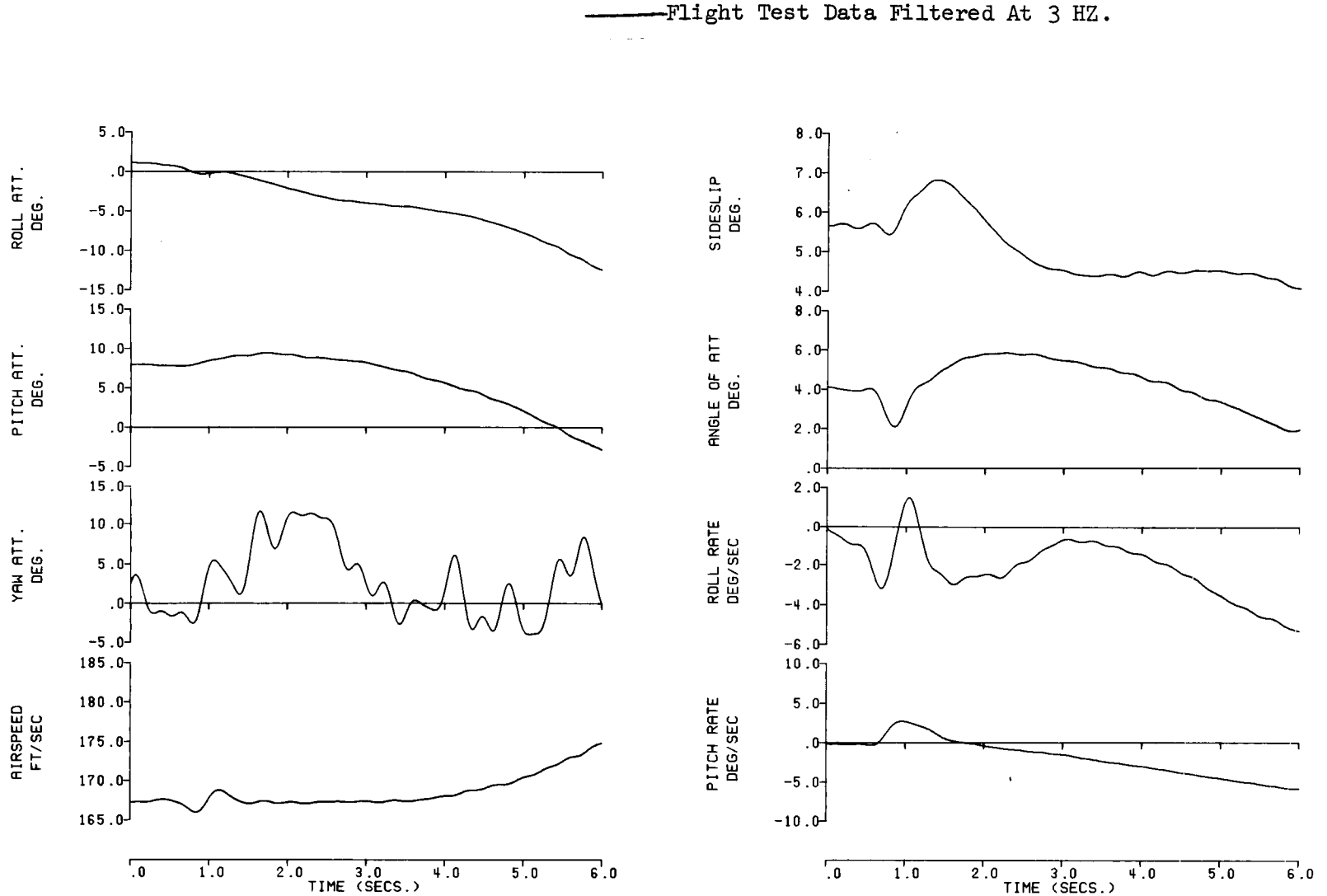
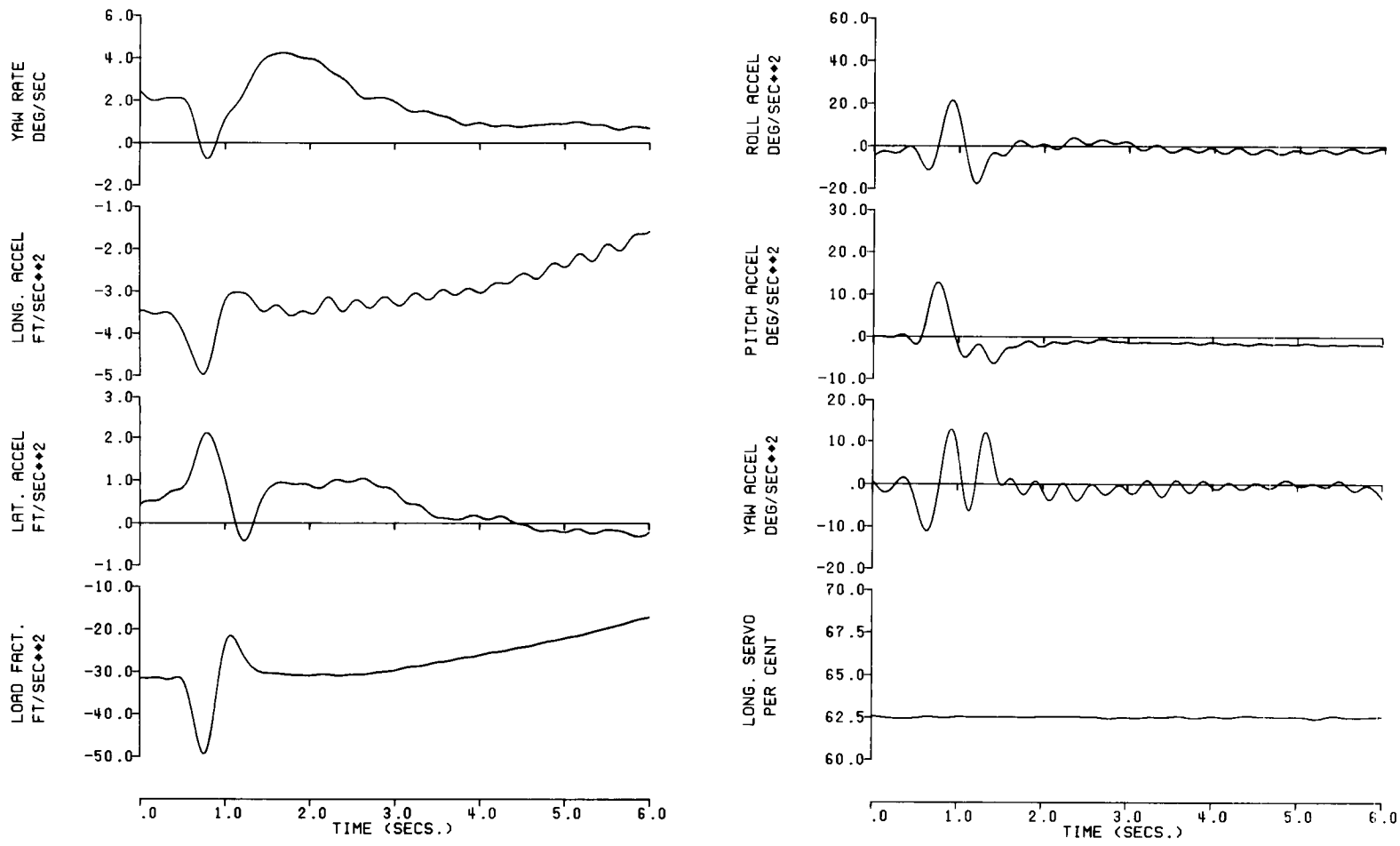


Figure 6. - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (100 knots, Maneuver 6).

——— Flight Test Data Filtered At 3 HZ.



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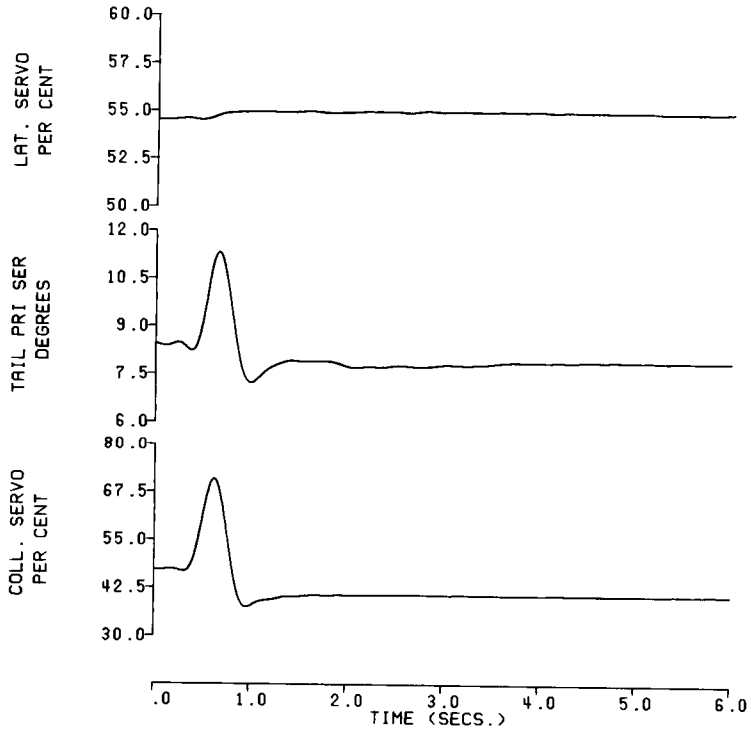
——— Flight Test Data Filtered At 3 HZ.



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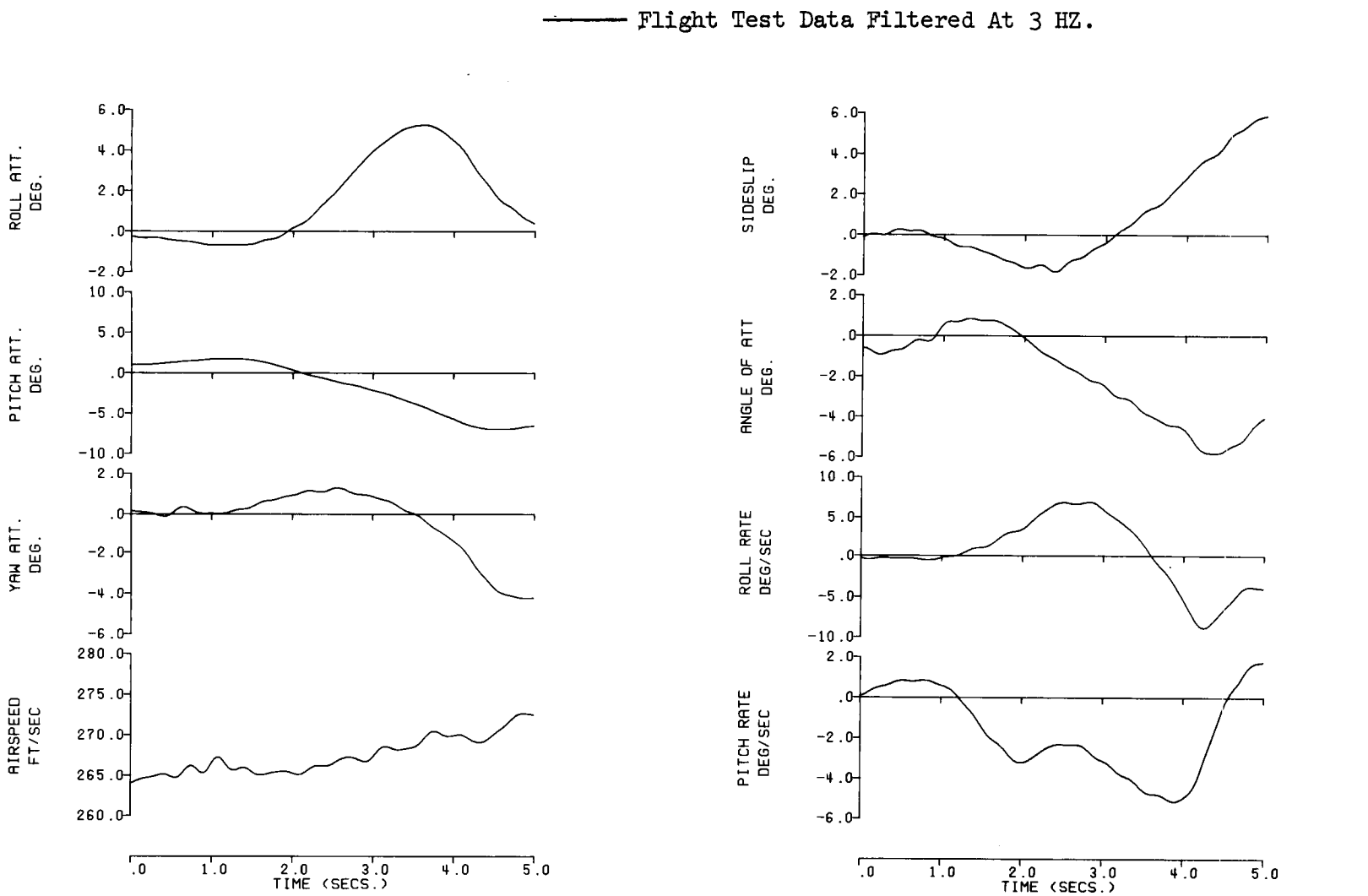
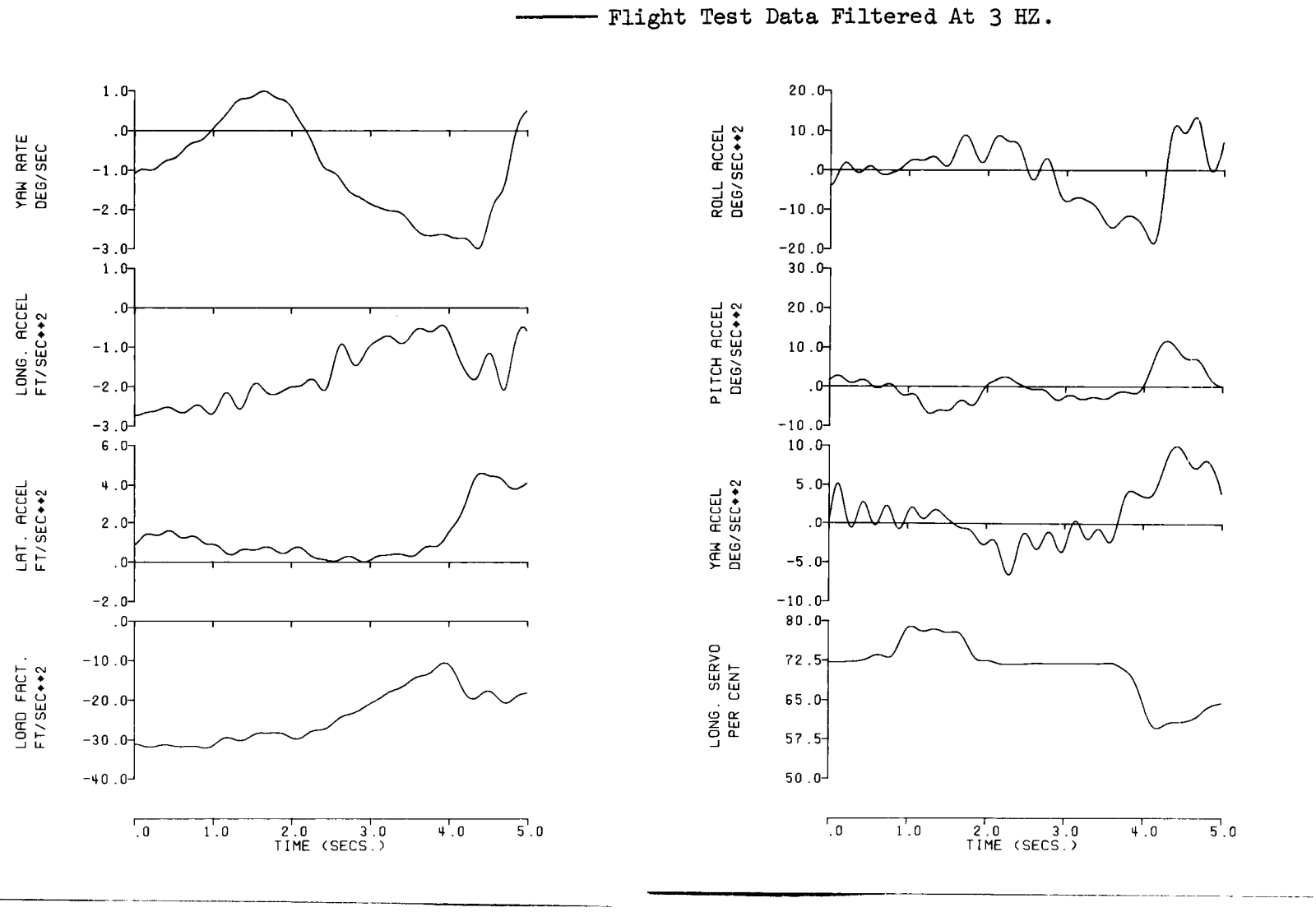


Figure 7. - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (150 knots, Maneuver 1).



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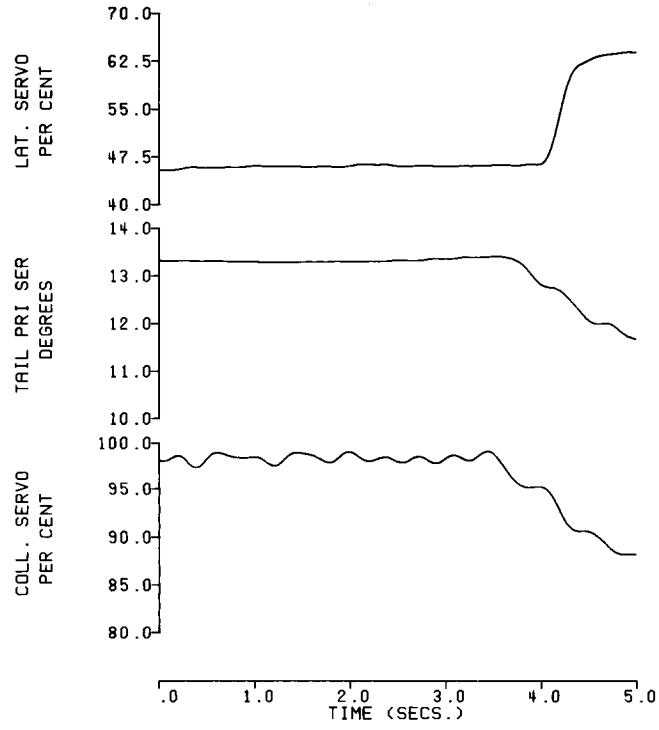
——— Flight Test Data Filtered At 3 HZ.



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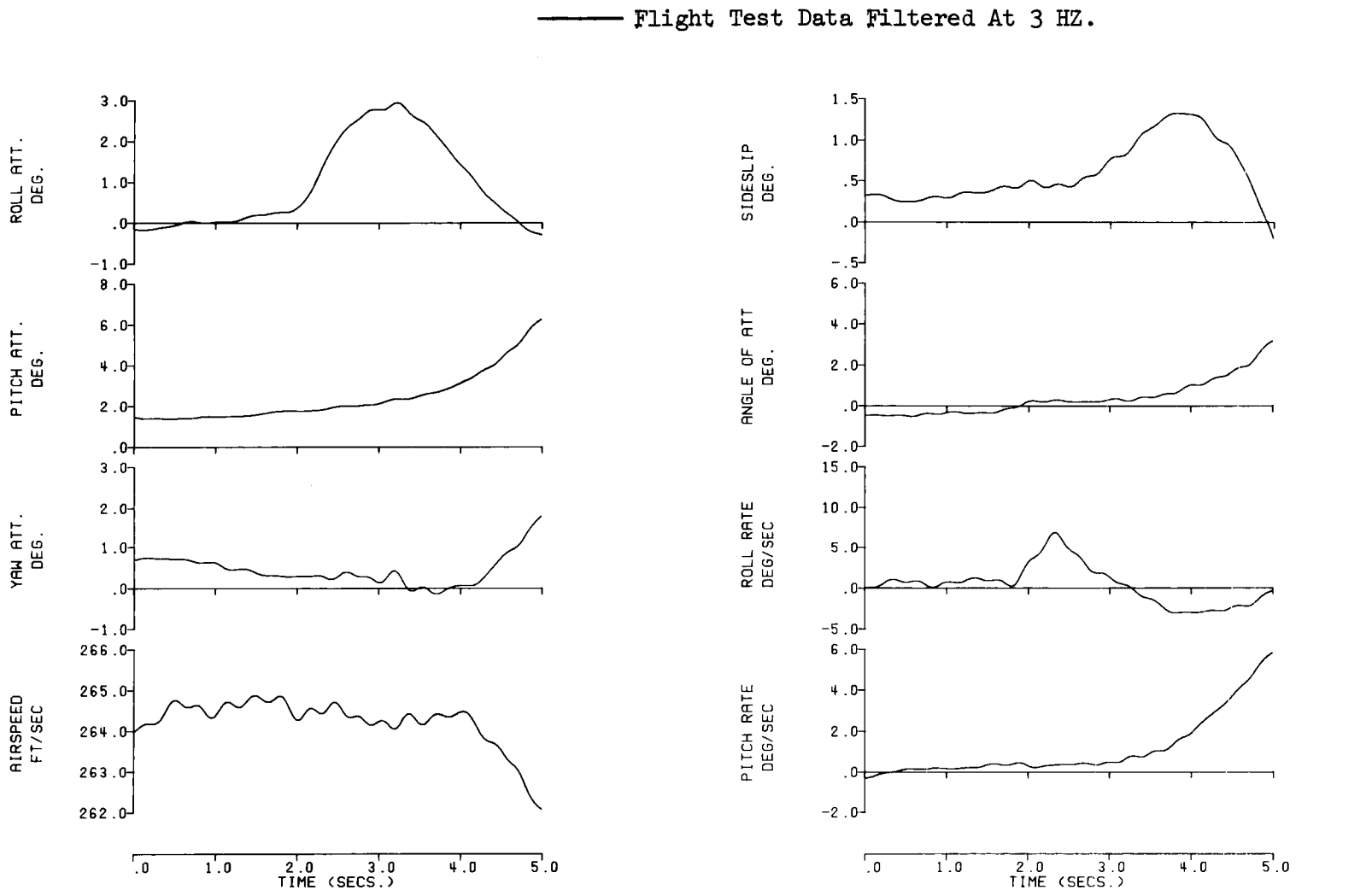
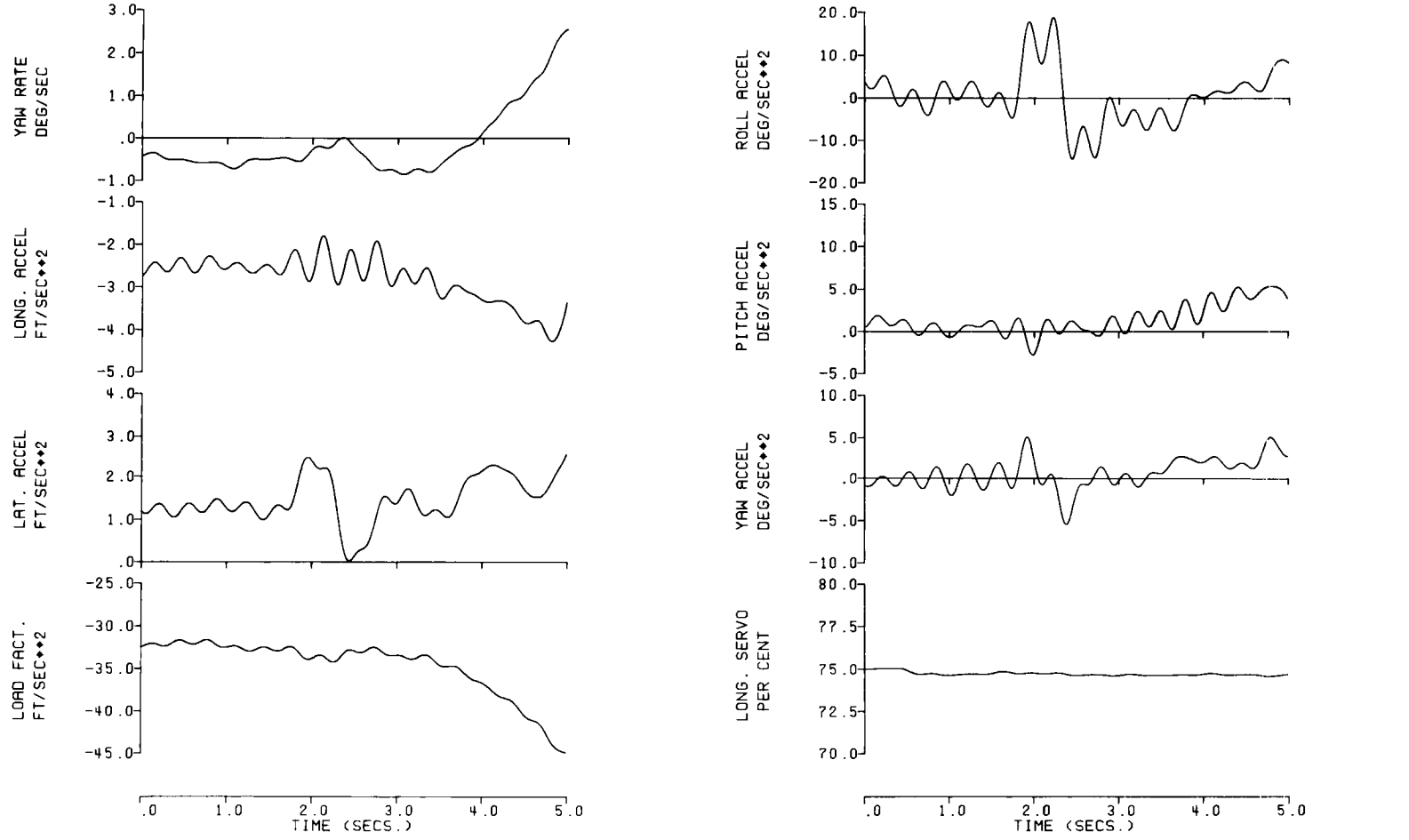


Figure 8. - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (150 knots, Maneuver 2).

——— Flight Test Data Filtered At 3 HZ.



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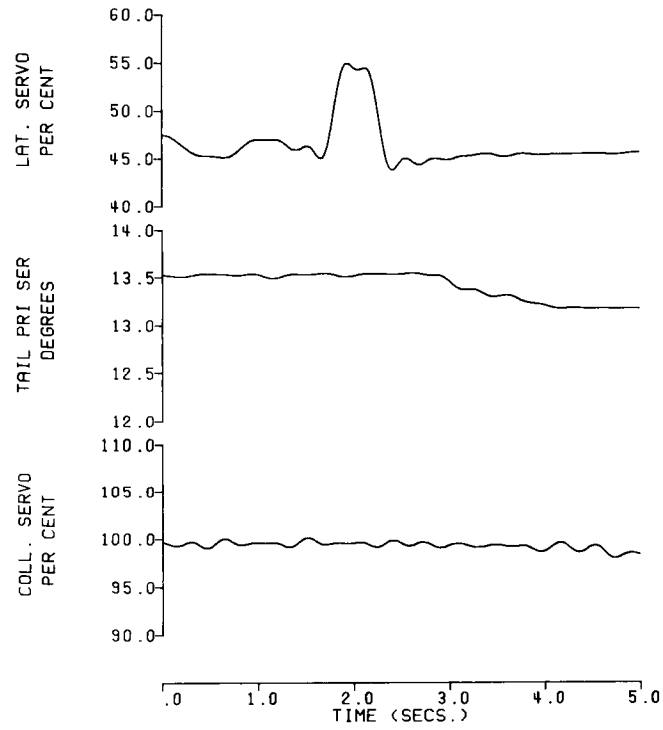
——— Flight Test Data Filtered At 3 HZ.



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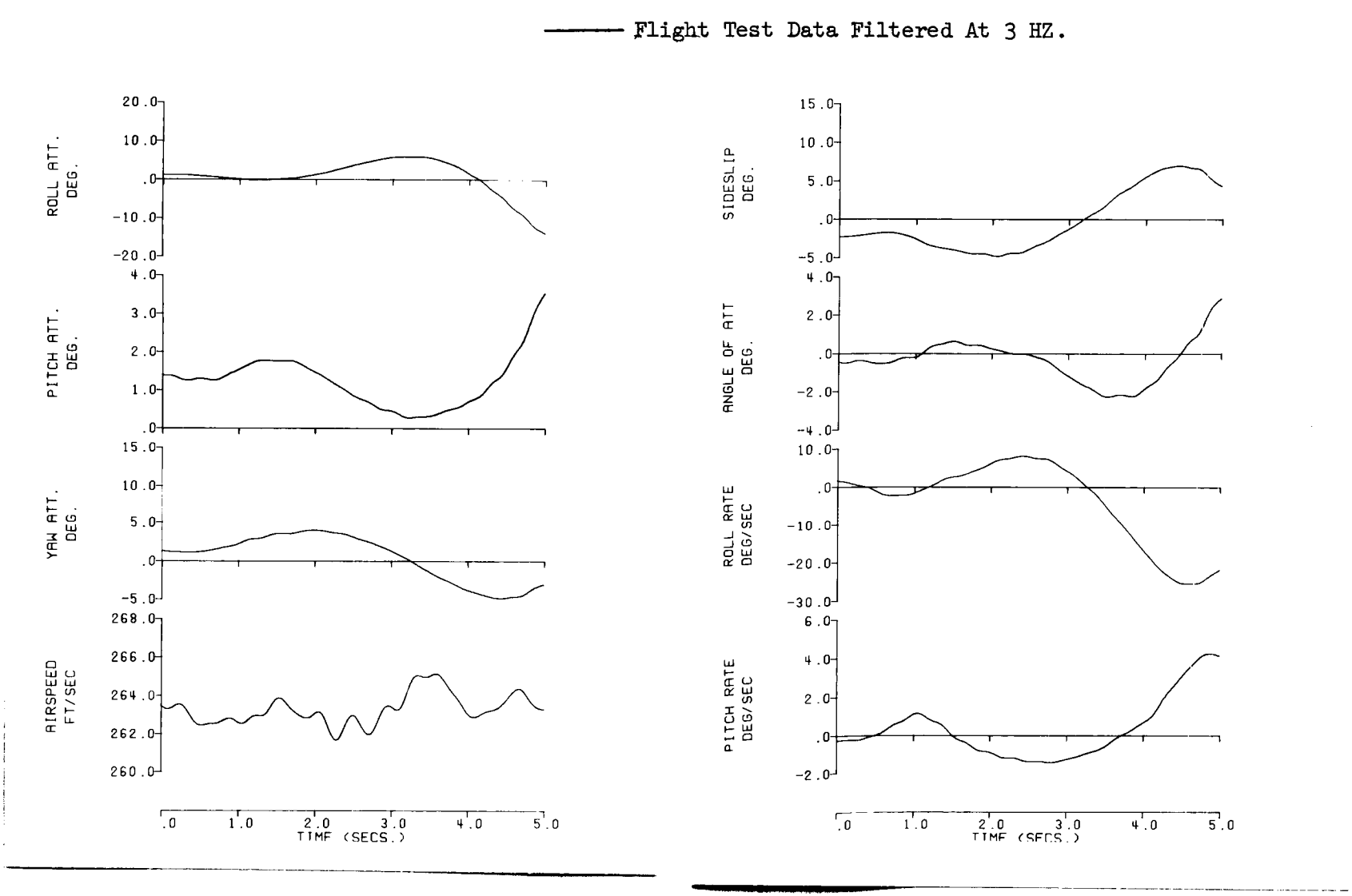
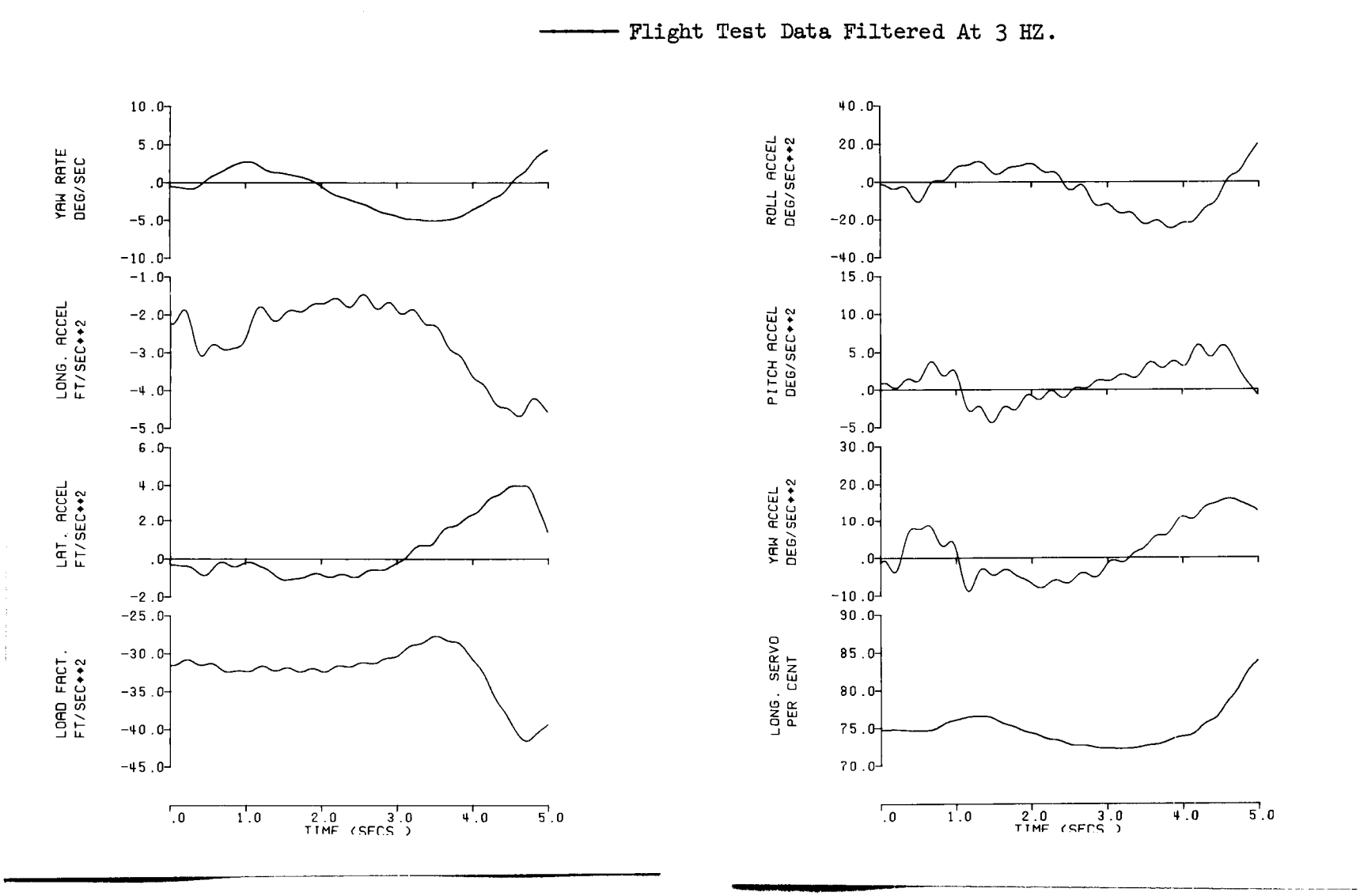


Figure 9. - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (150 knots, Maneuver 3).



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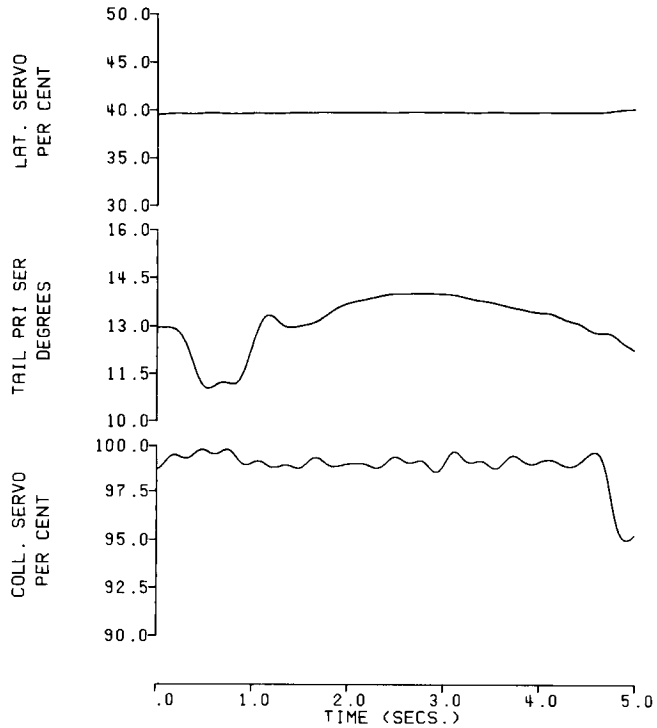
——— Flight Test Data Filtered At 3 HZ.



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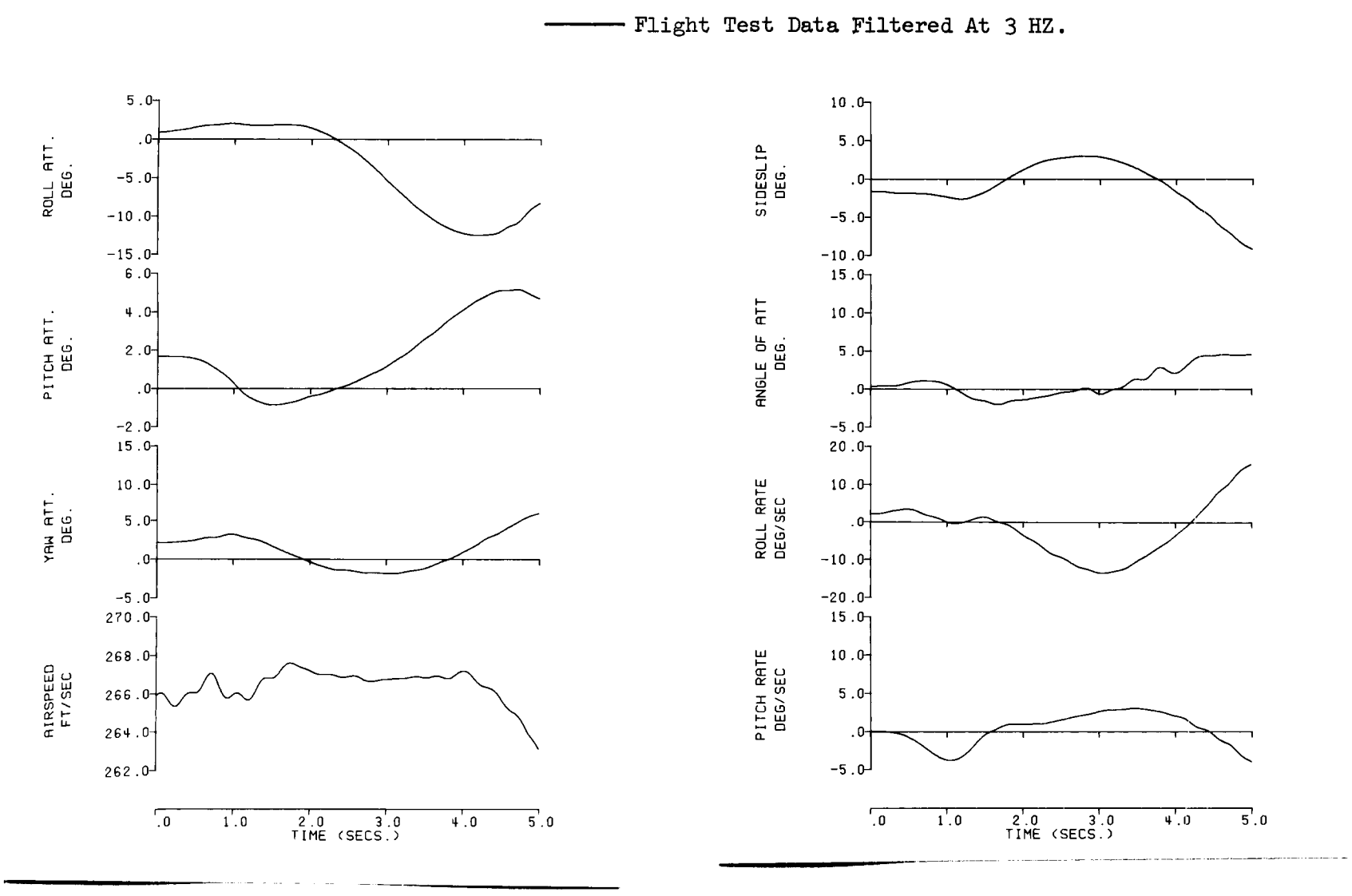
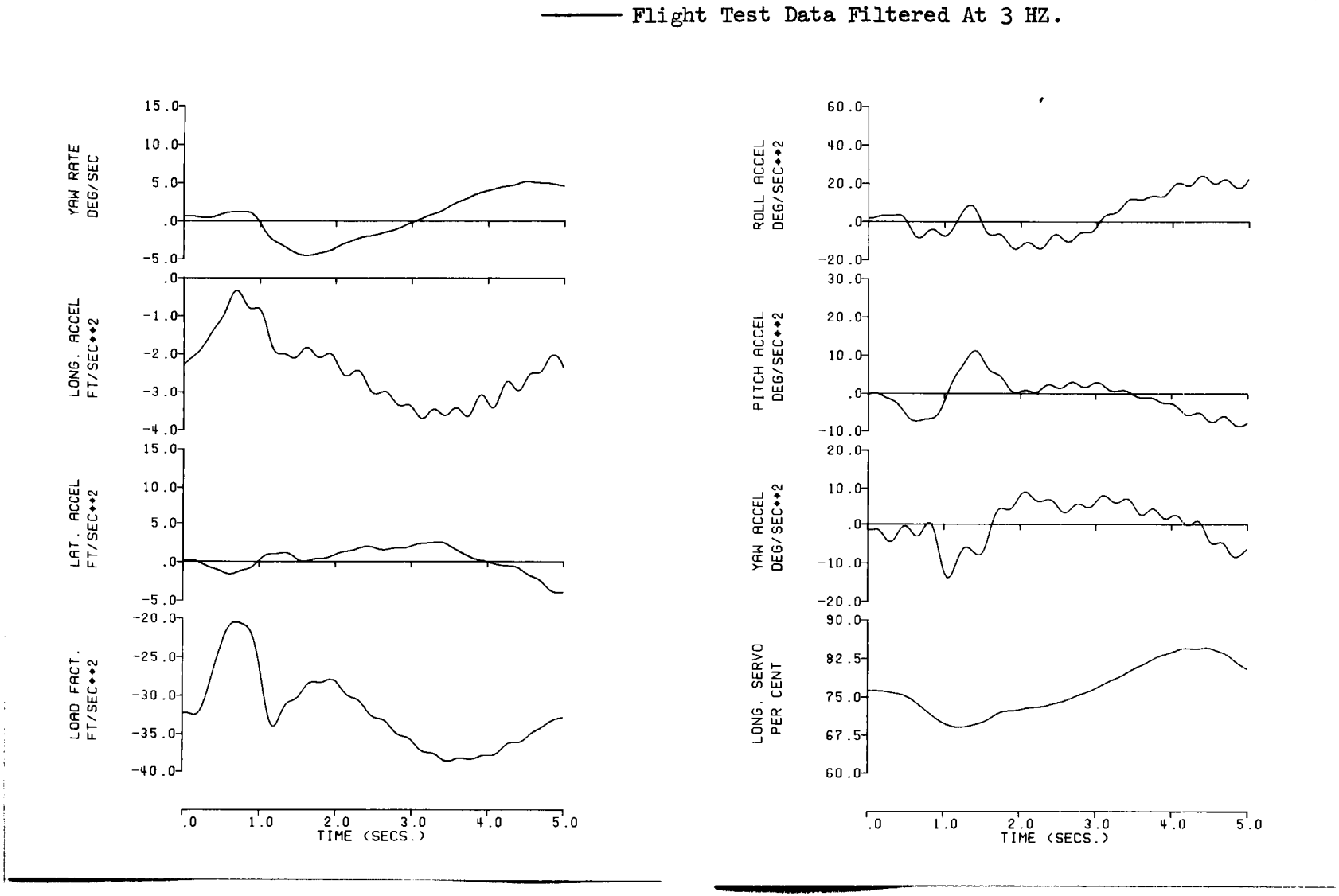


Figure 10. - Flight Test Data From CH-53A Filtered With A Digital Filter At 3 HZ. (150 knots, Maneuver 4).



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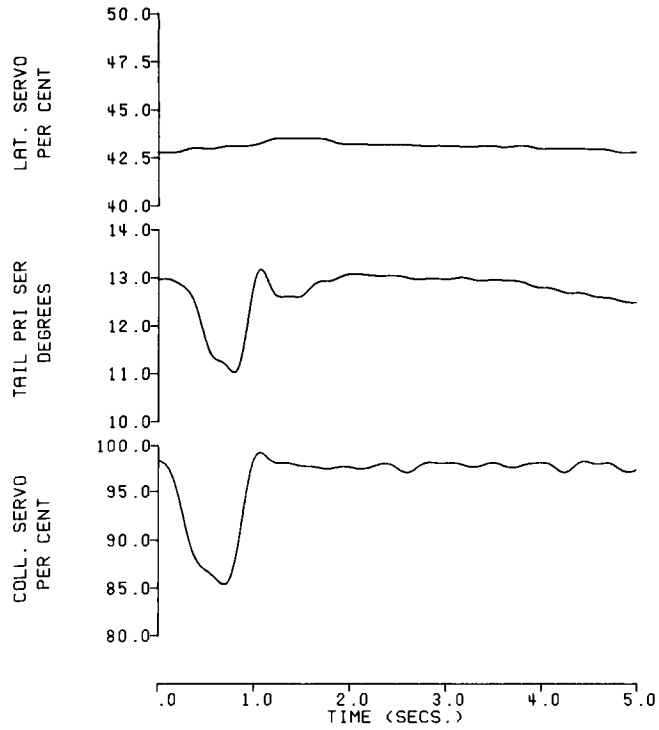
——— Flight Test Data Filtered At 3 HZ.



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——— Flight Test Data Filtered at 8 HZ.

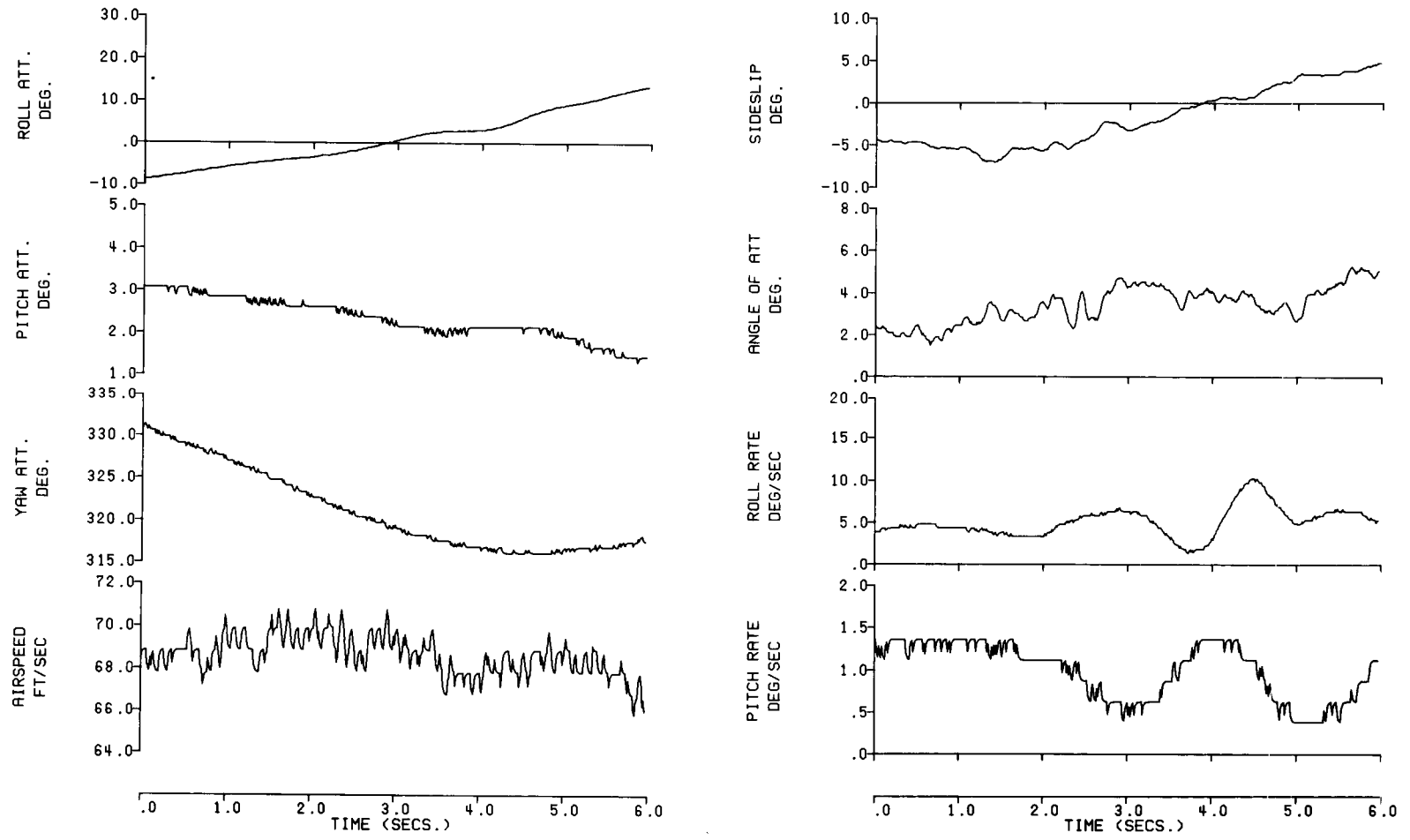


Figure 11 - Flight Test Data From CH-54B Filtered With a First Order Low Pass Filter at 8 HZ. (45 knots, Maneuver 1)

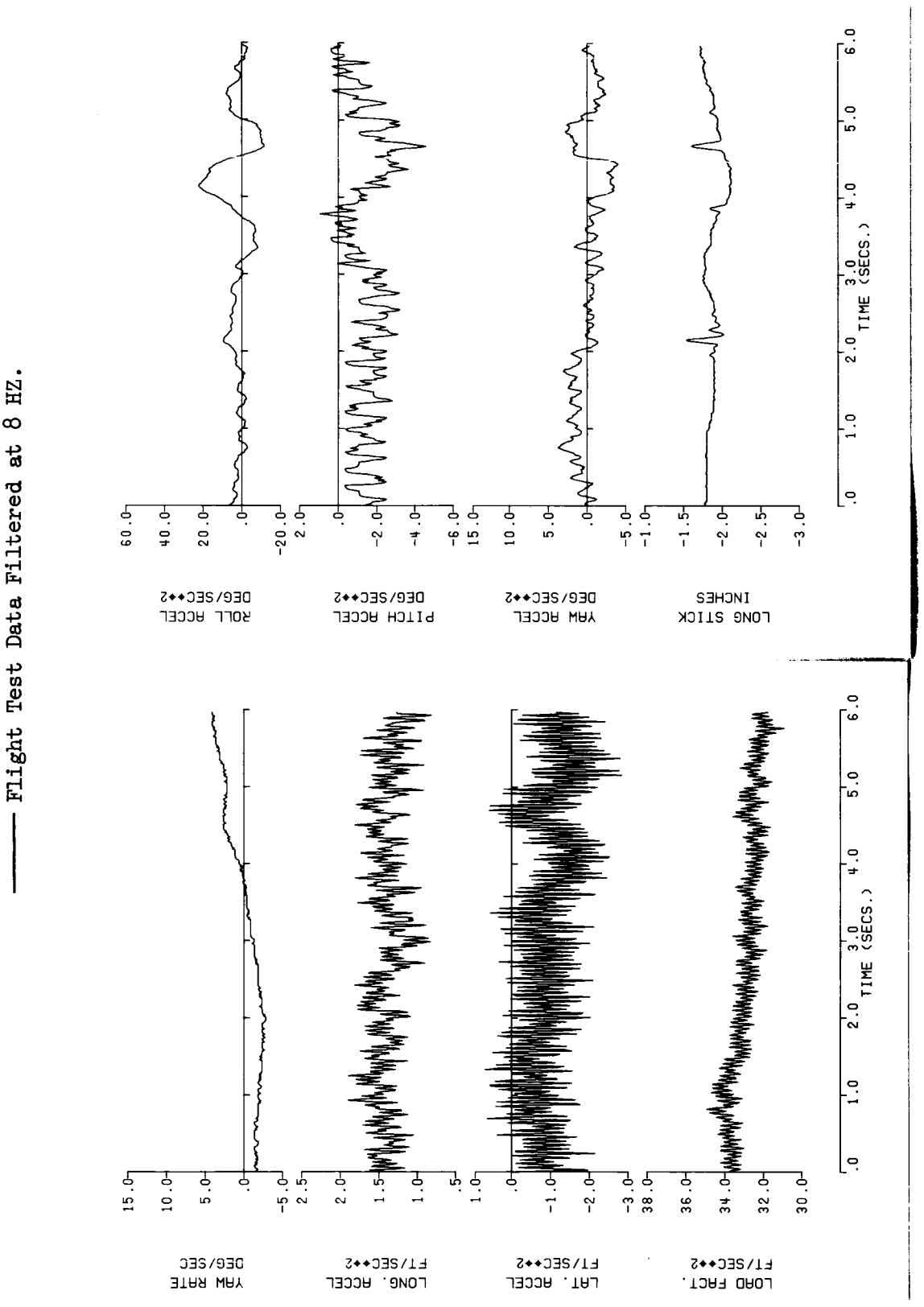


Figure 11. - Continued.

——— Flight Test Data Filtered at 8 HZ.

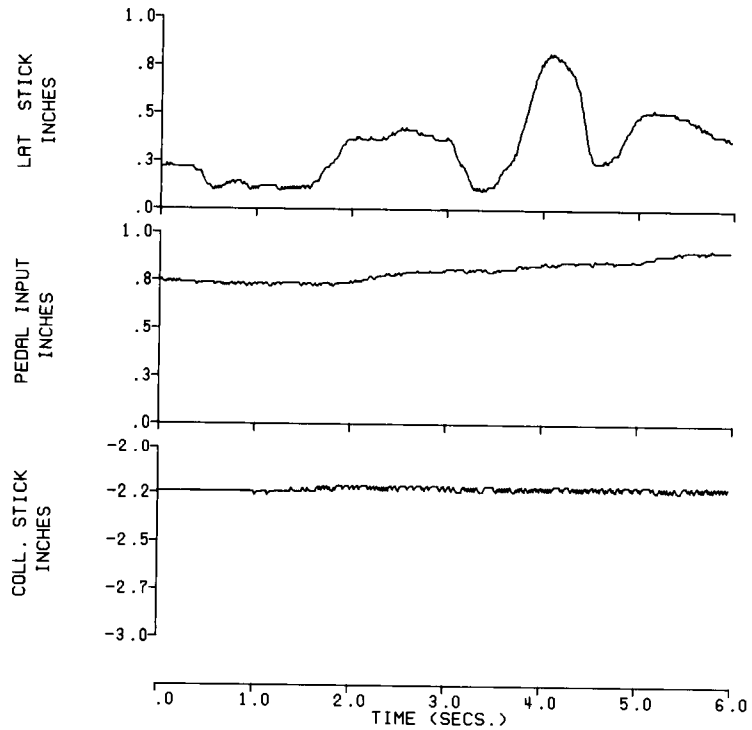


Figure 11. - Concluded.

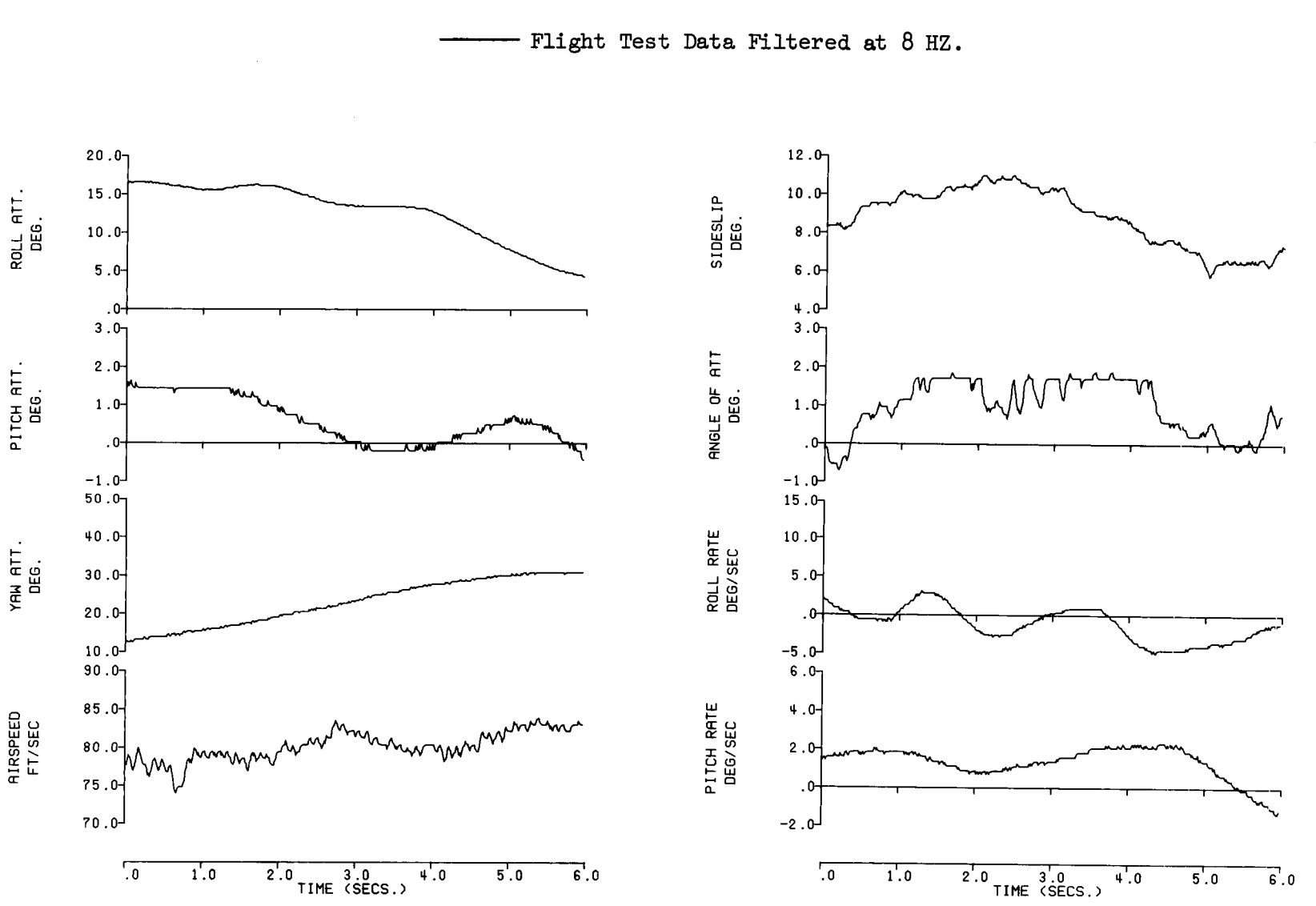


Figure 12. - Flight Test Data From CH-54B Filtered With a First Order Low Pass Filter at 8 HZ. (45 knots, Maneuver 2)

——— Flight Test Data Filtered at 8 HZ.

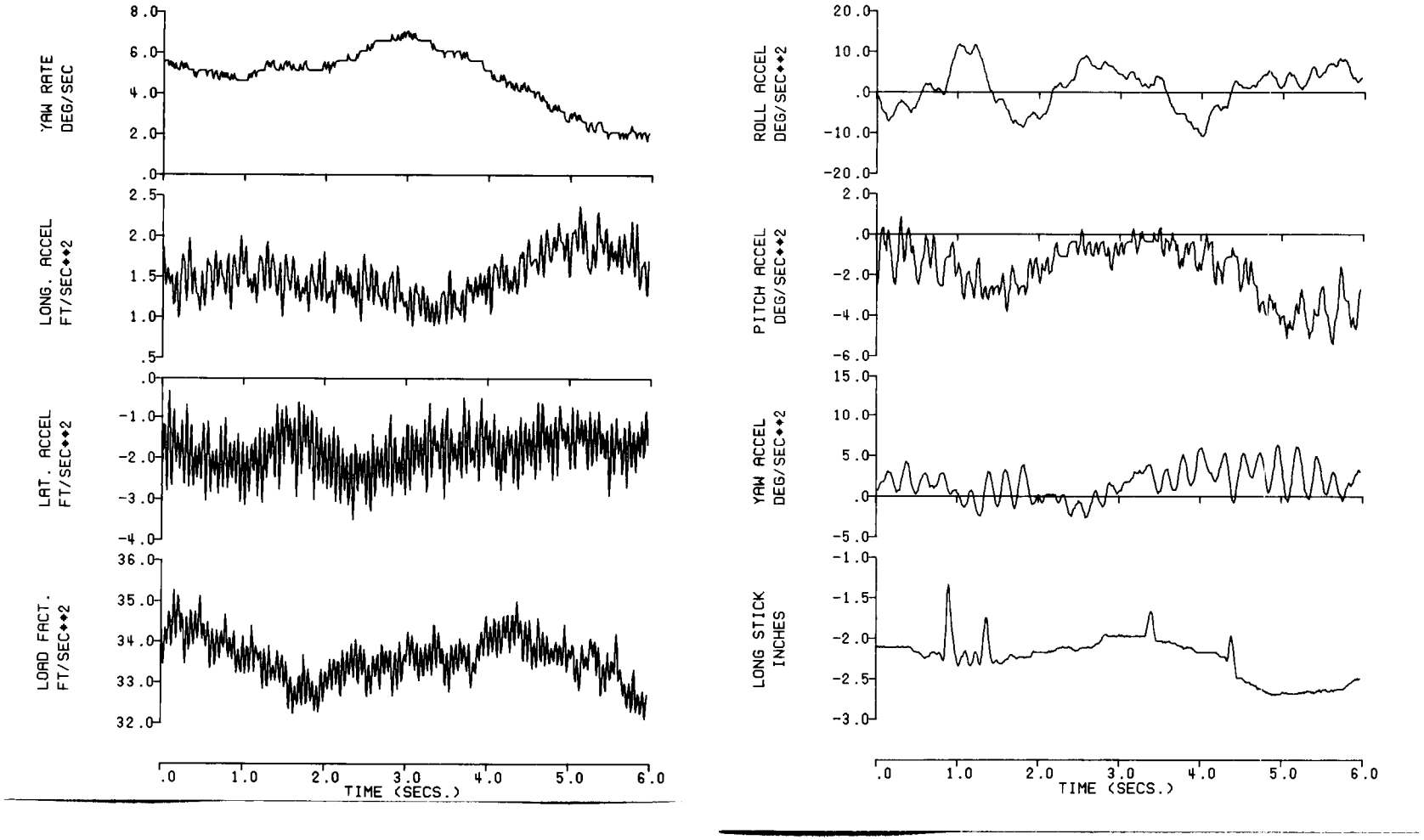
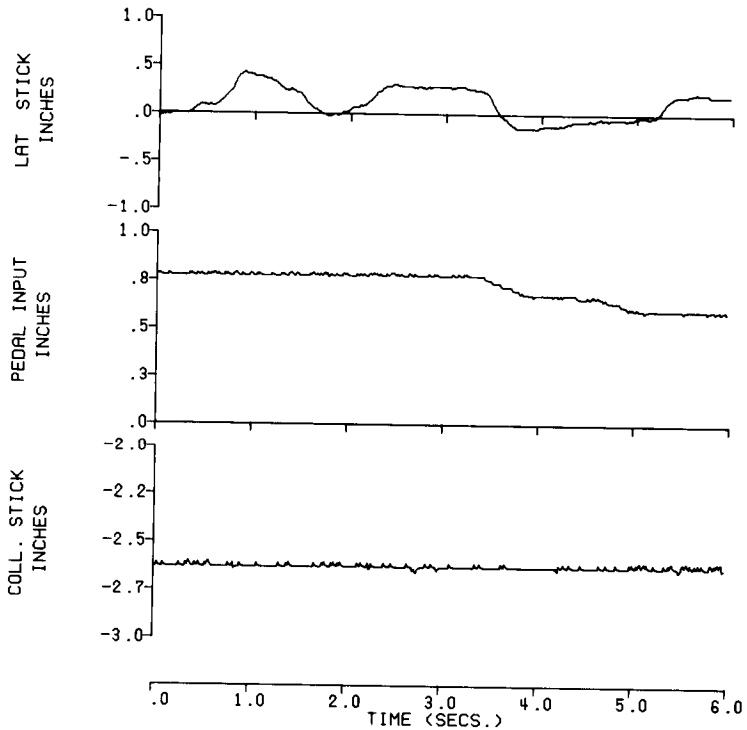


Figure 12. - Continued.

——— Flight Test Data Filtered at 8 HZ.



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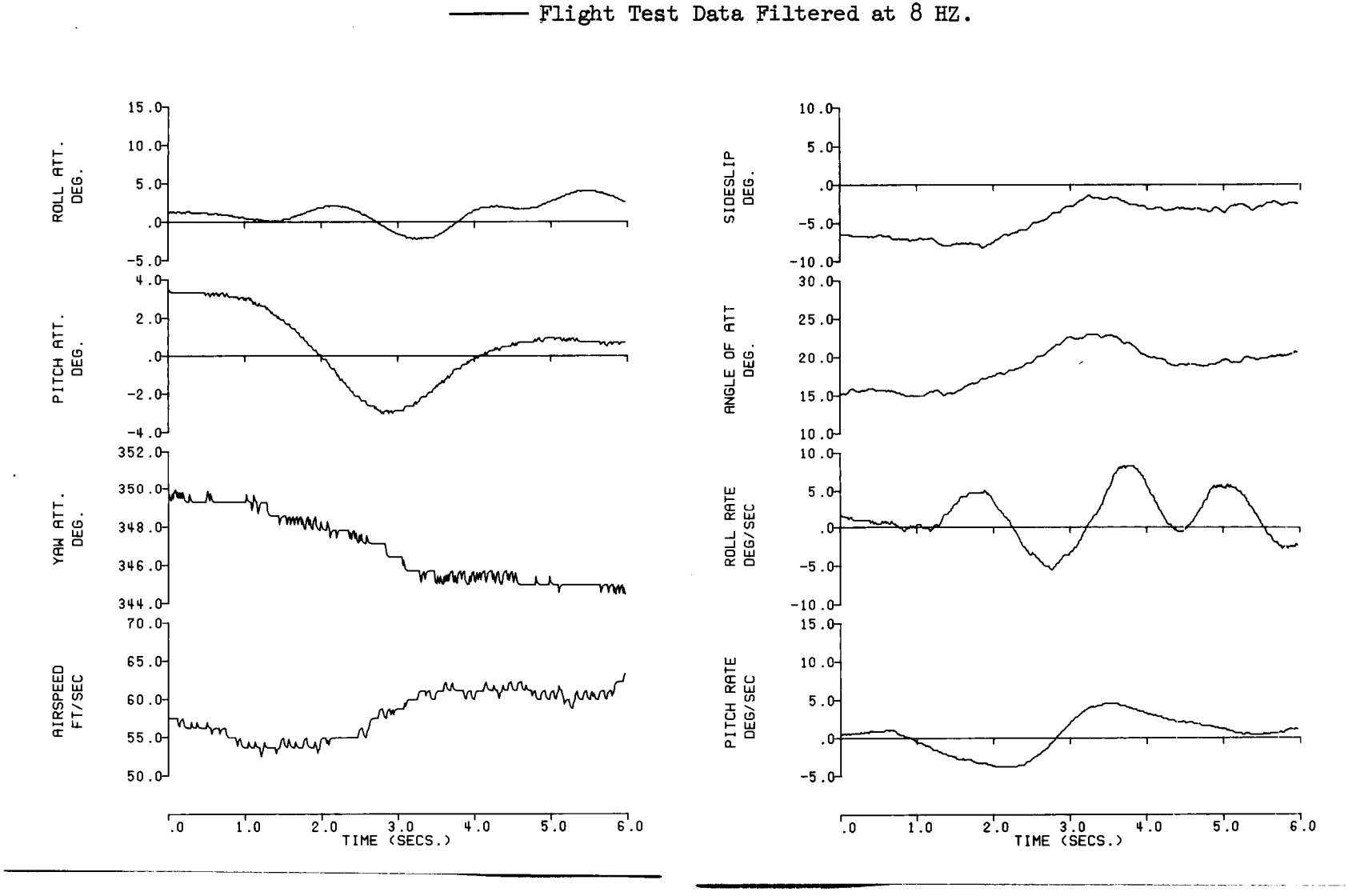


Figure 13. - Flight Test Data From CH-54B Filtered With A First Order Low Pass Filter at 8 HZ. (45 knots, Maneuver 3).

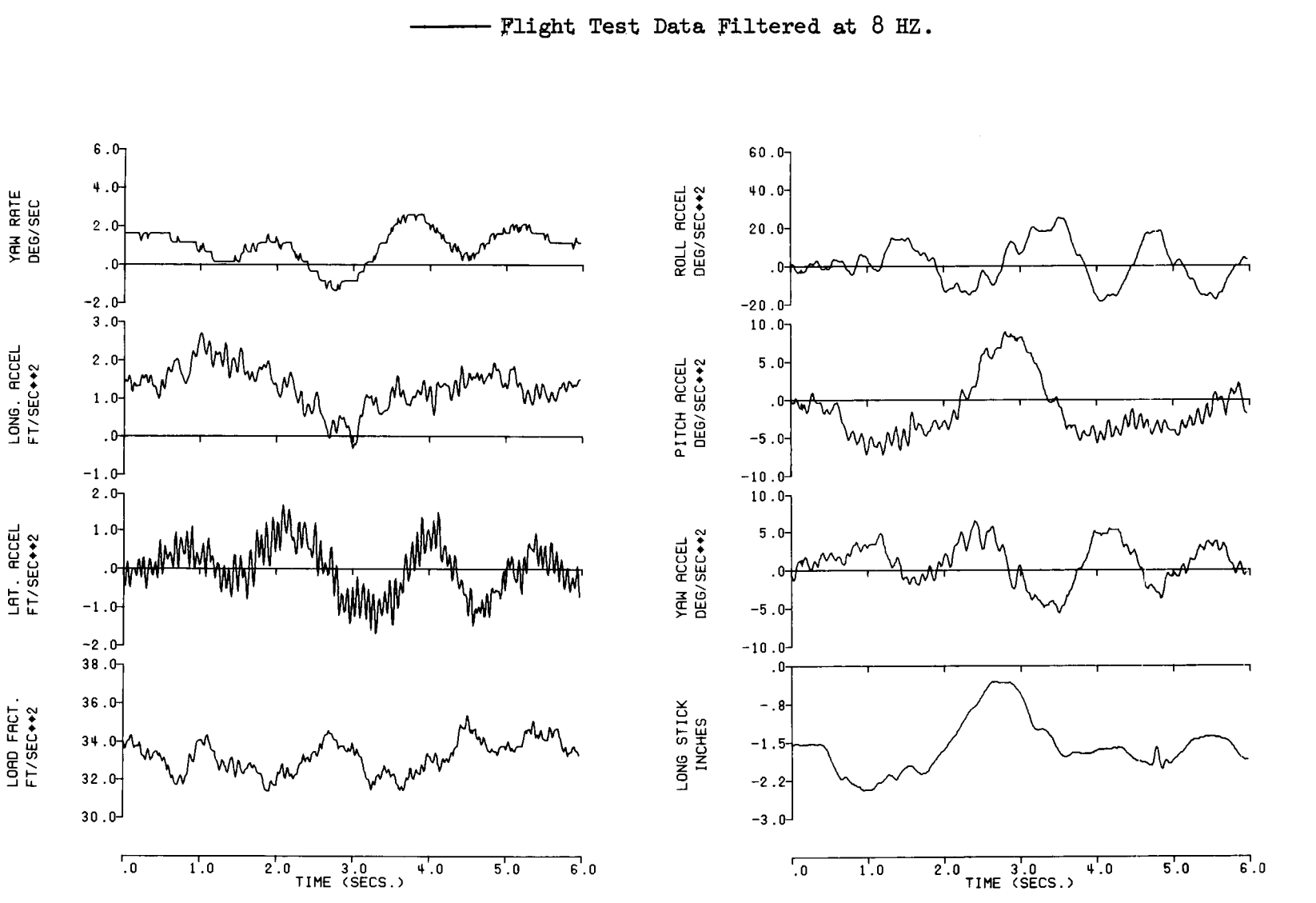


Figure 13. - Continued.

——— Flight Test Data Filtered at 8 HZ.

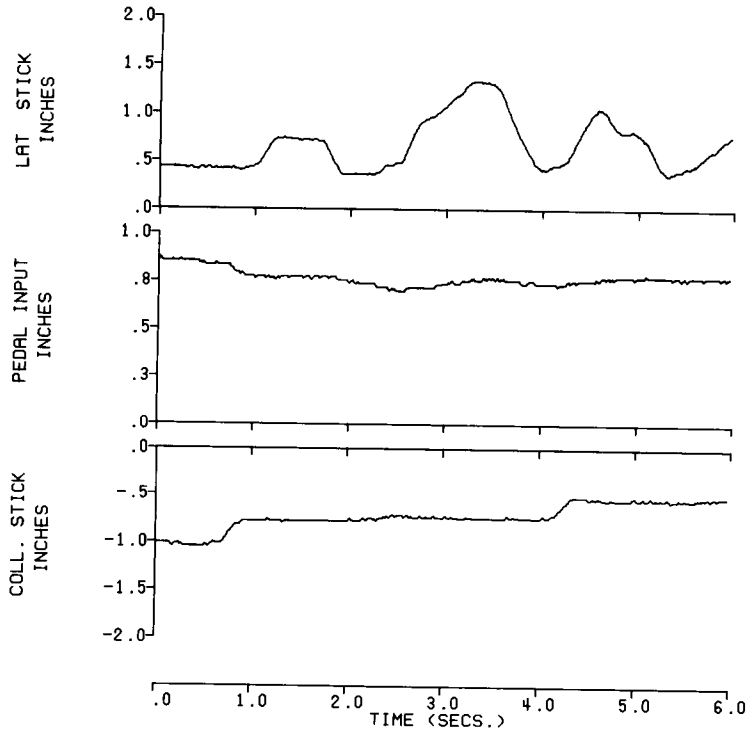


Figure 13. - Concluded.

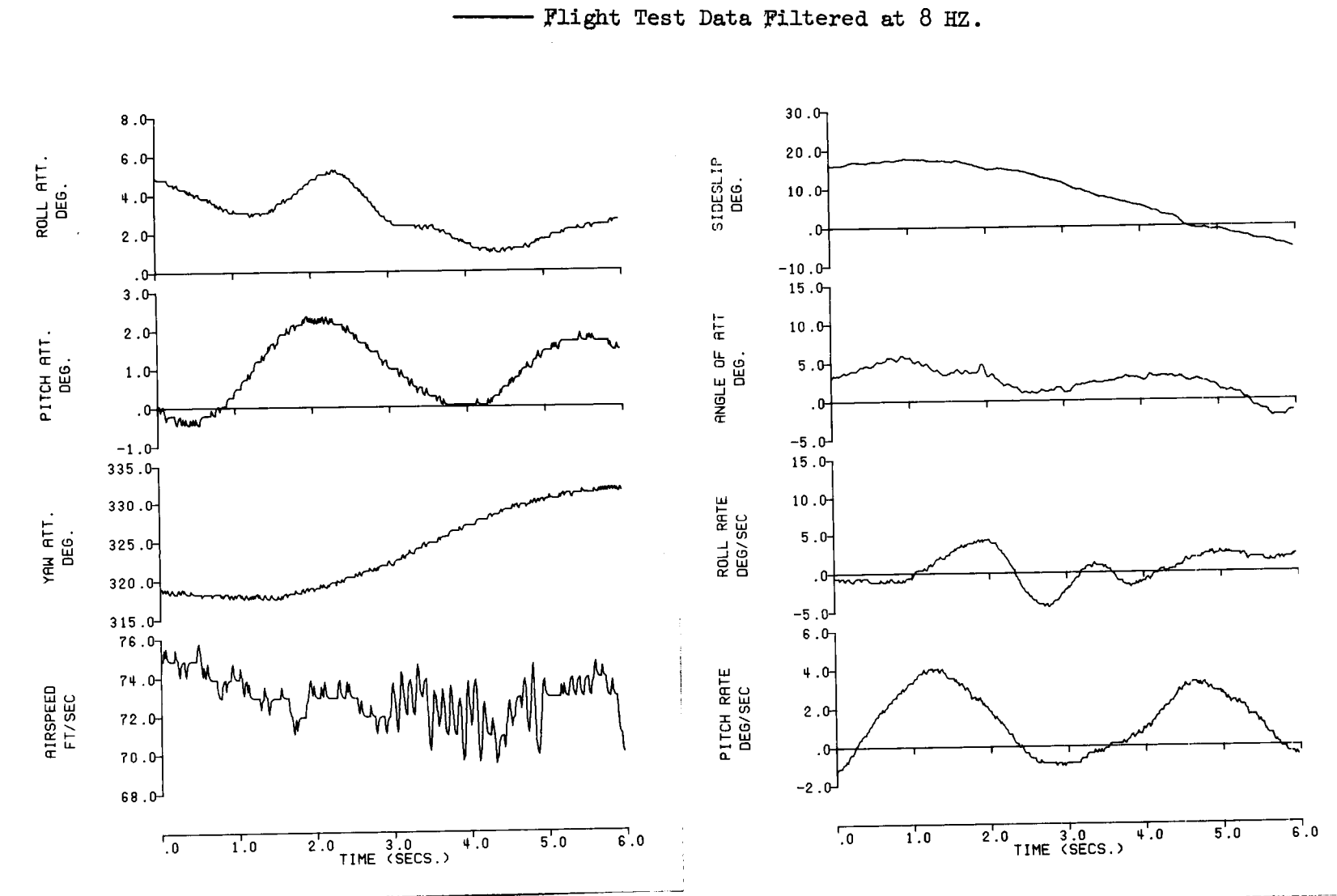


Figure 14. - Flight Test Data From CH-54B Filtered With A First Order Low Pass Filter at 8 HZ. (45 knots, Maneuver 4).

——— Flight Test Data Filtered at 8 HZ.

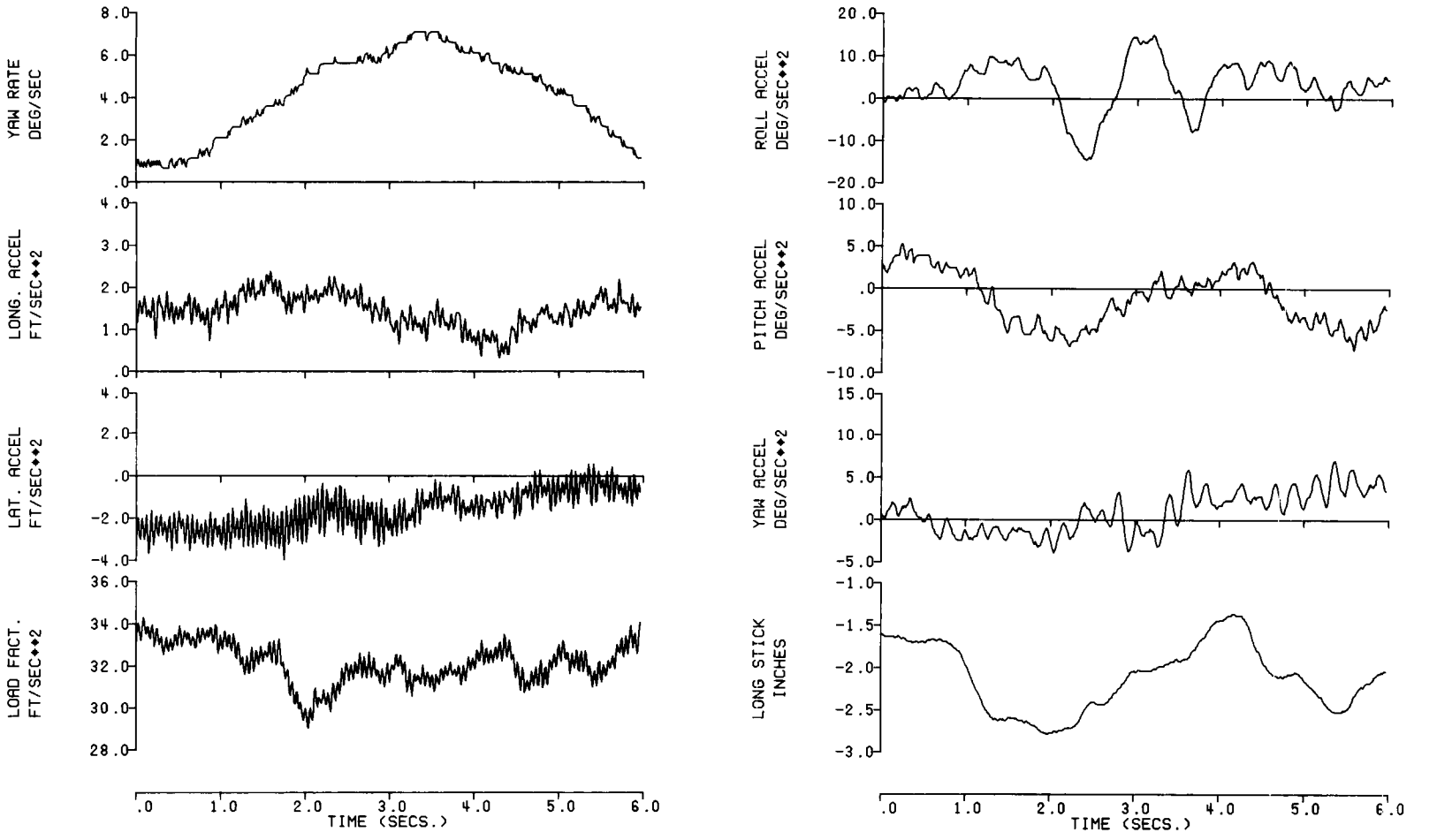


Figure 14. - Continued.

——— Flight Test Data Filtered at 8 HZ.

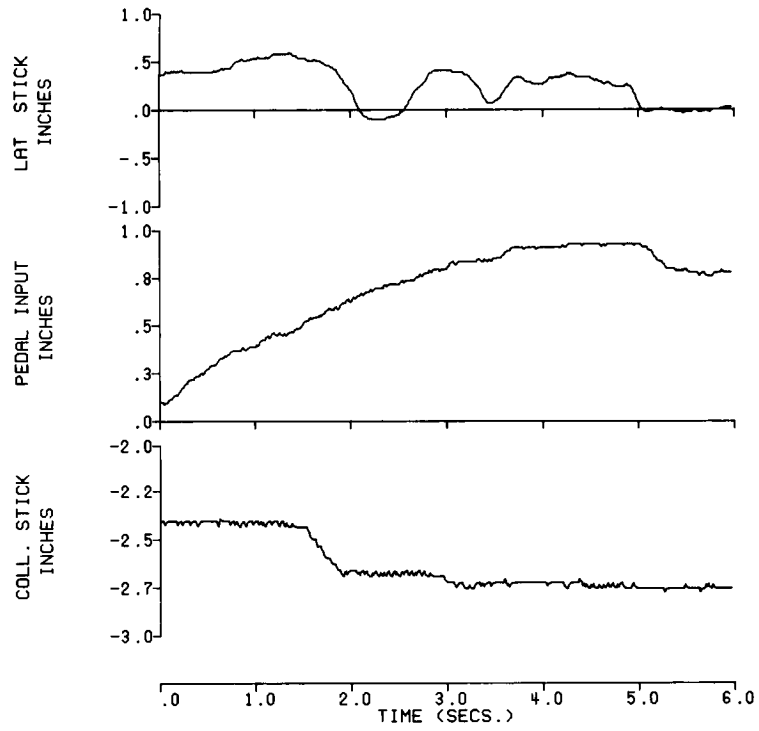


Figure 14. - Concluded.

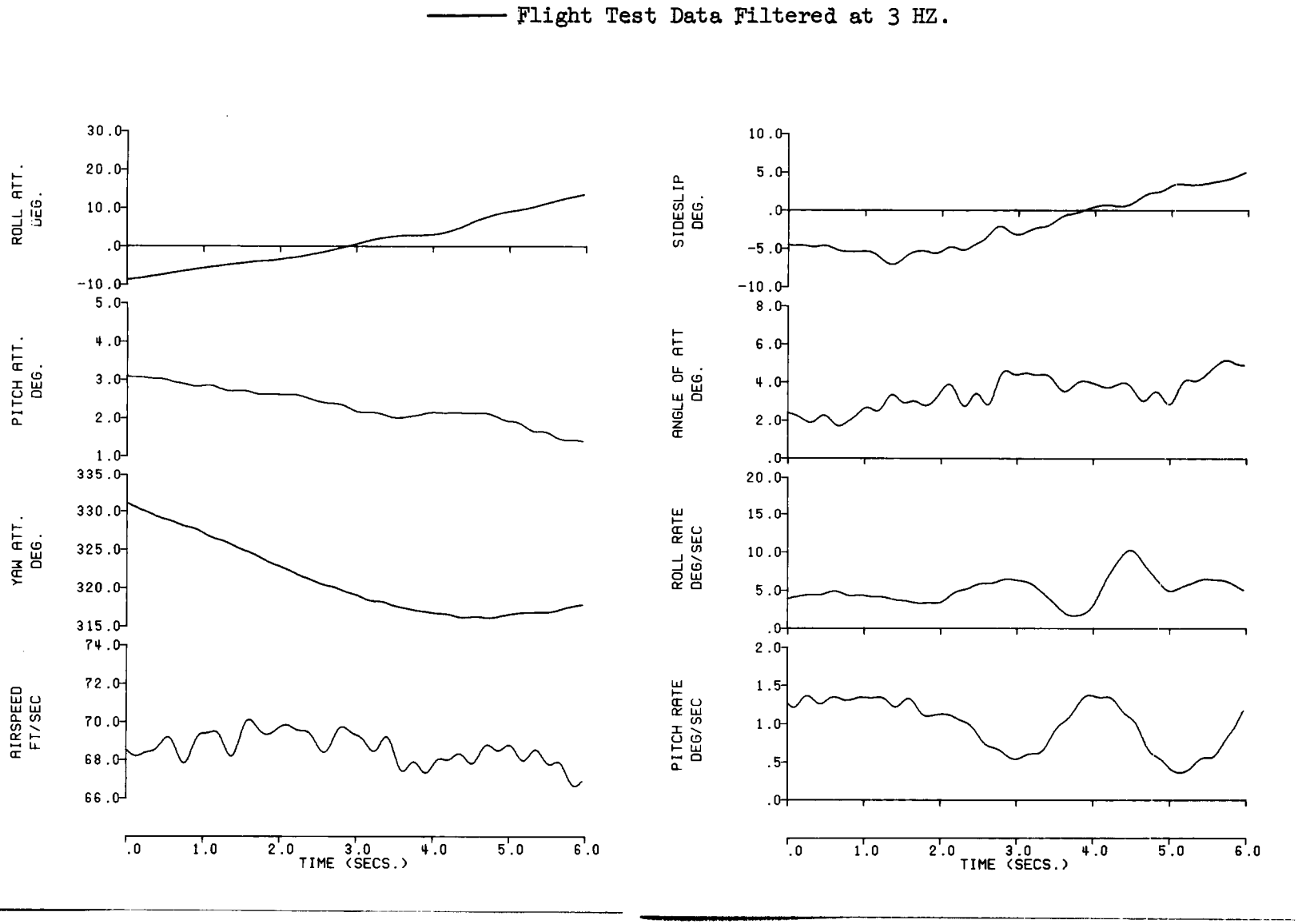


Figure 15. - Flight Test Data From CH-54B Filtered With A Digital Filter At 3 HZ. (45 knots, Maneuver 1).

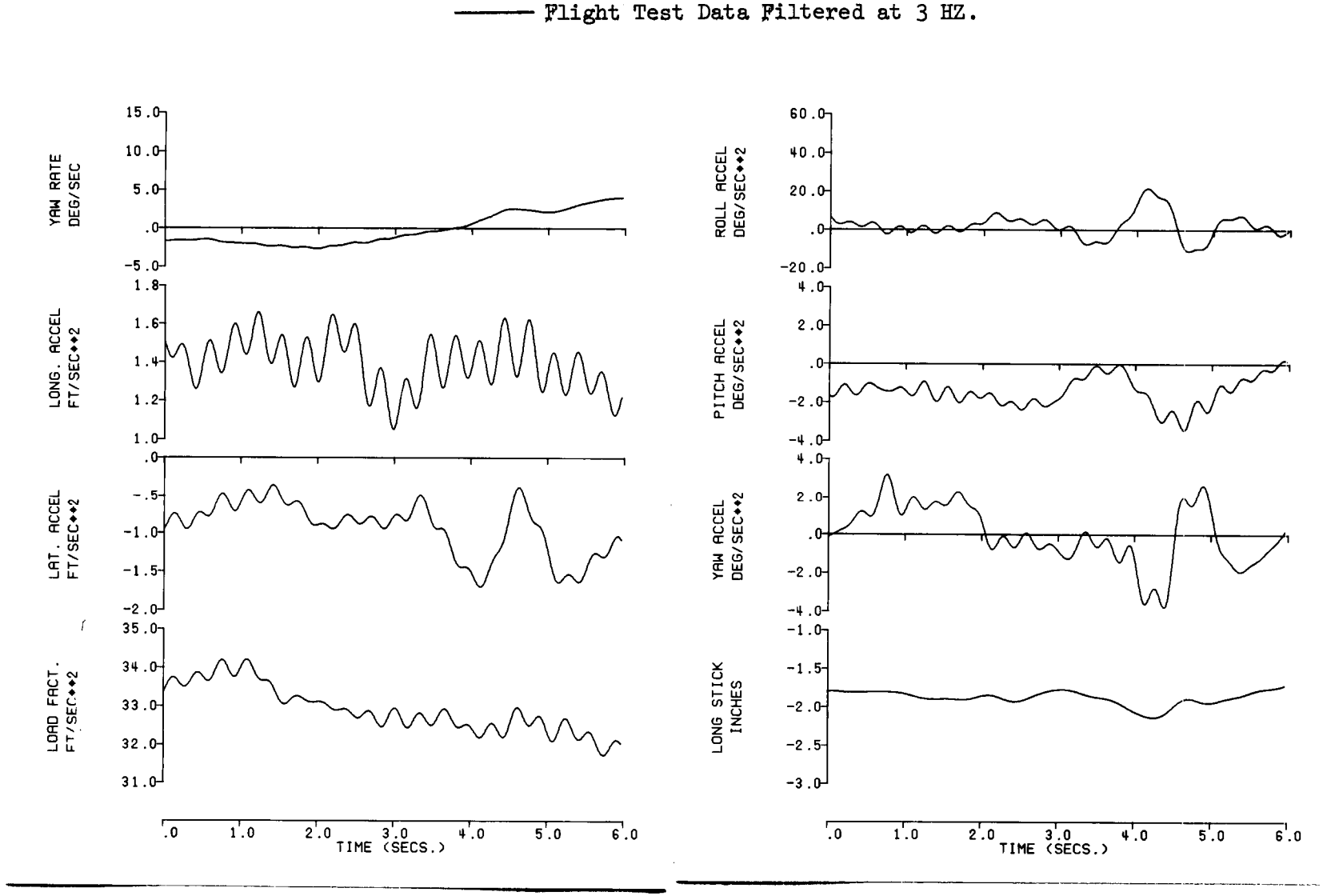


Figure 15. - Continued.

——— Flight Test Data Filtered at 3 HZ.

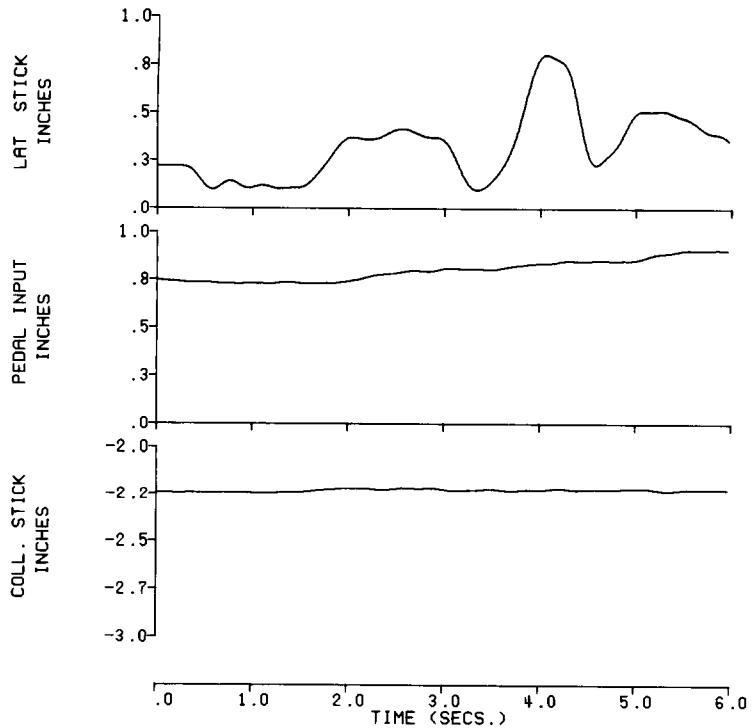


Figure 15. - Concluded.

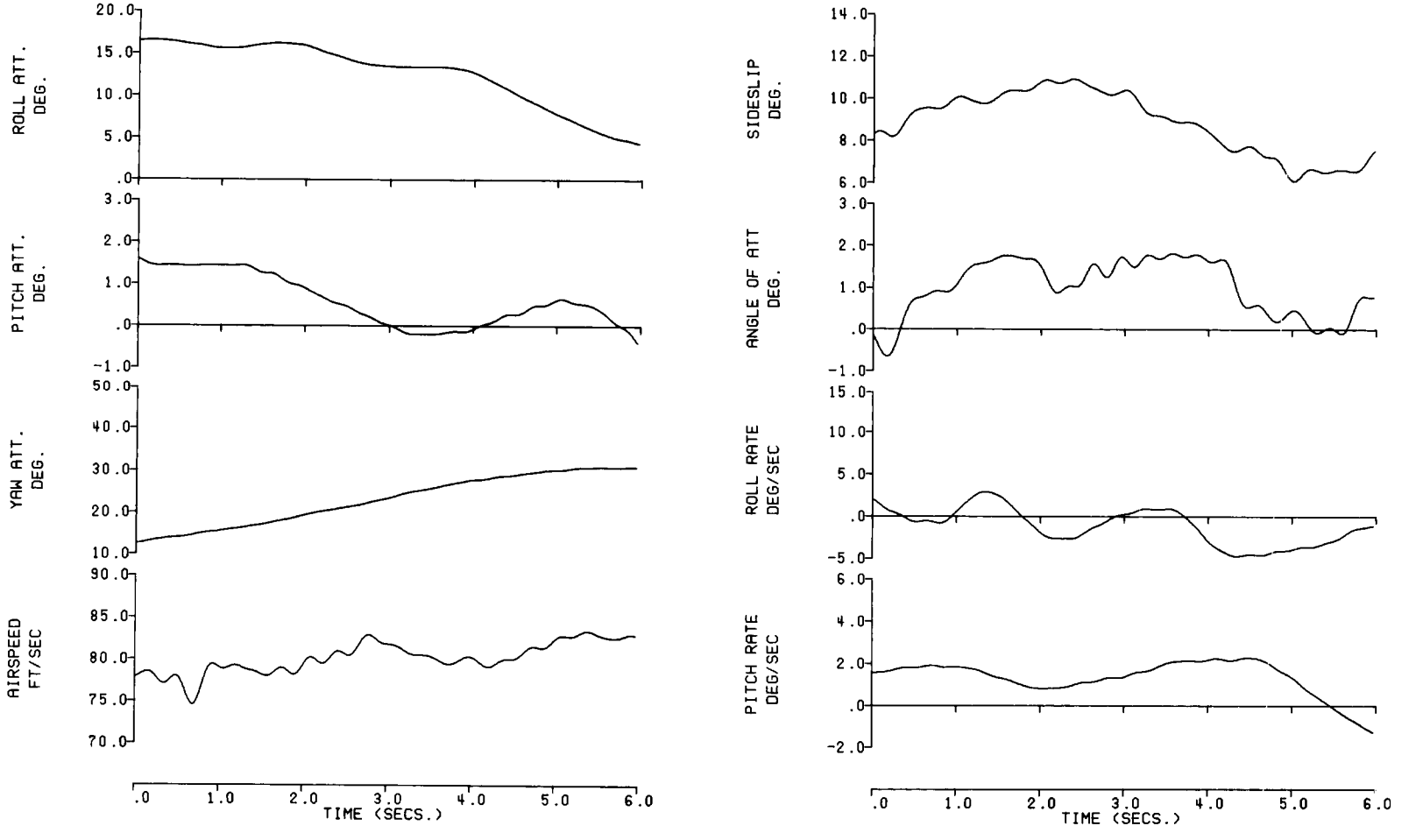


Figure 16. - Flight Test Data From CH-54B Filtered With A Digital Filter At 3 HZ. (45 knots, Maneuver 2).

——— Flight Test Data Filtered at 3 HZ.

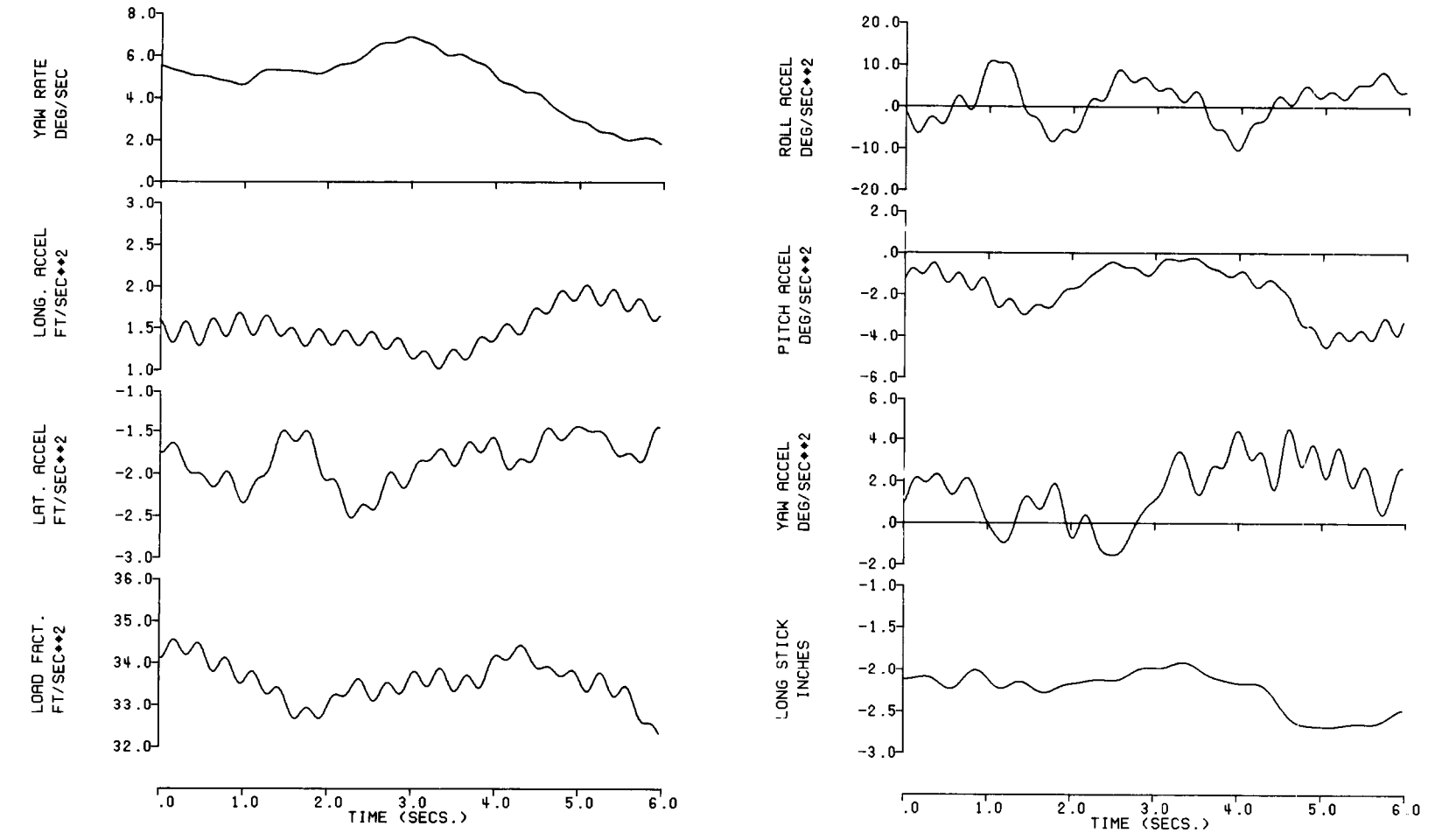
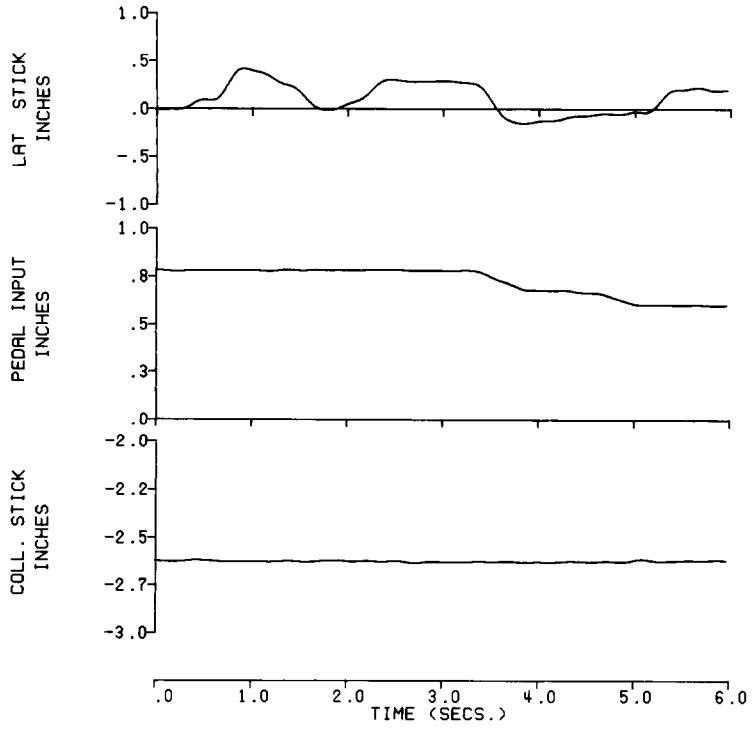


Figure 16. - Continued.

——— Flight Test Data Filtered at 3 HZ.



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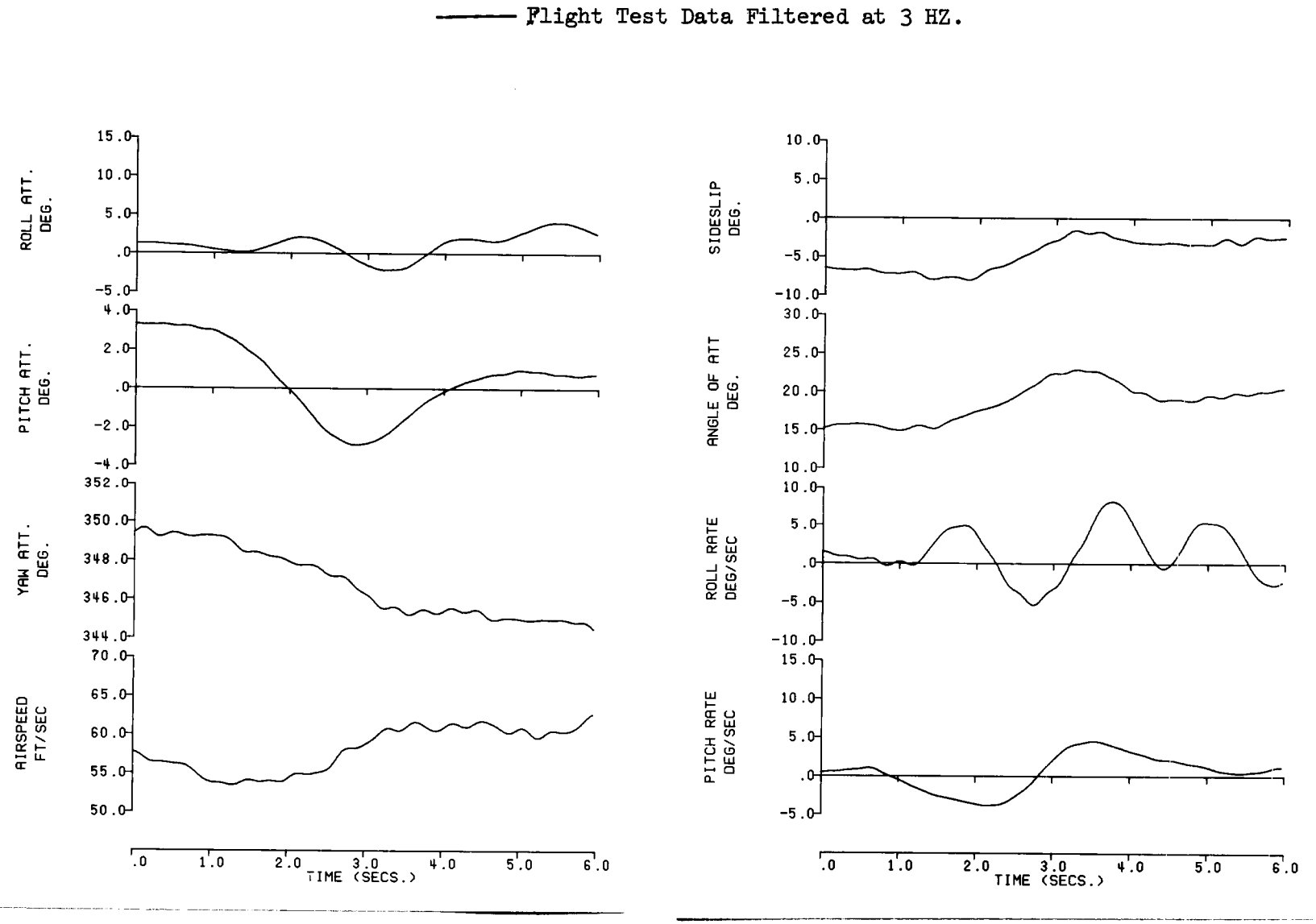


Figure 17. - Flight Test Data From CH-54B Filtered With A Digital Filter At 3 HZ. (45 knots, Maneuver 3).

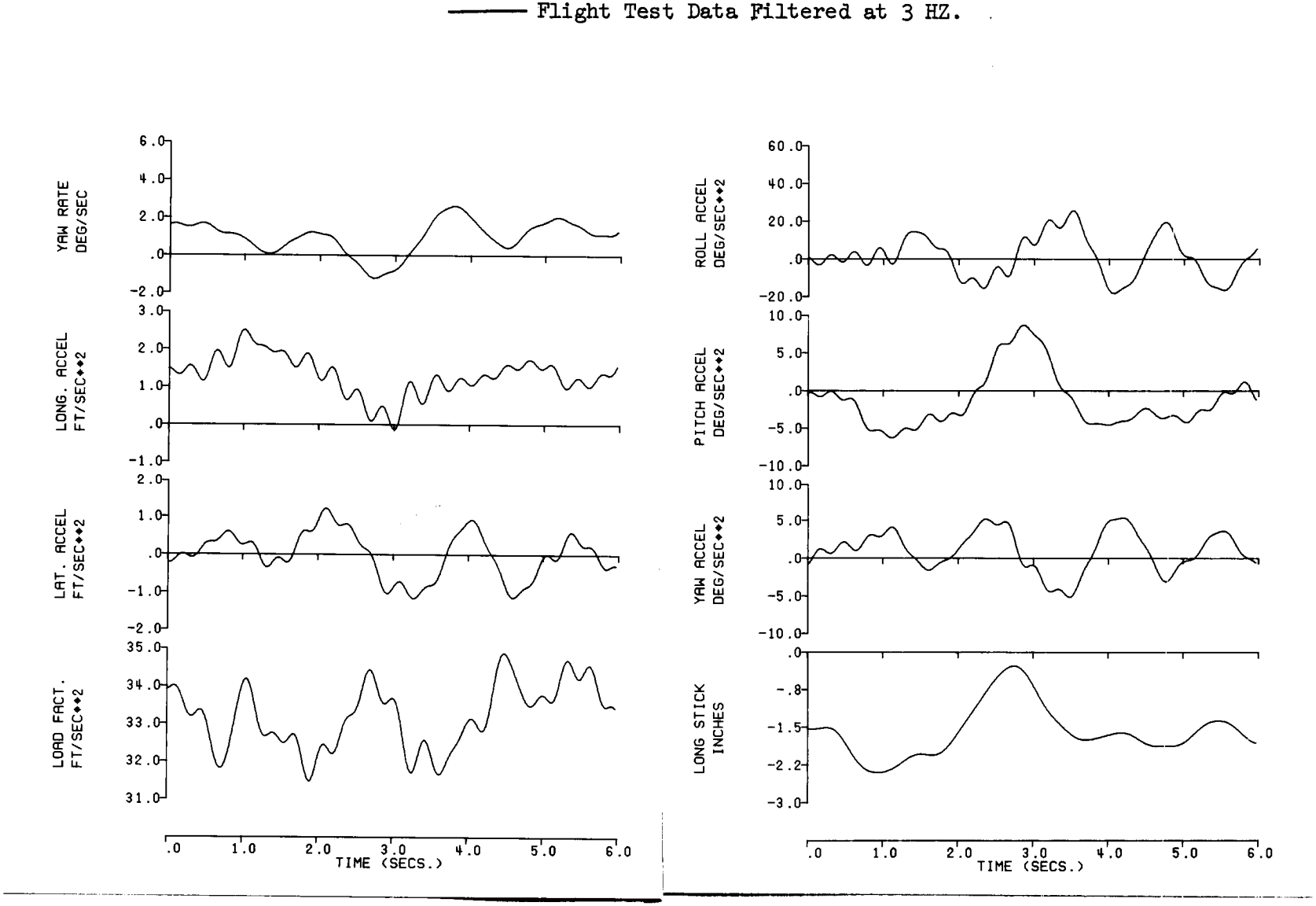
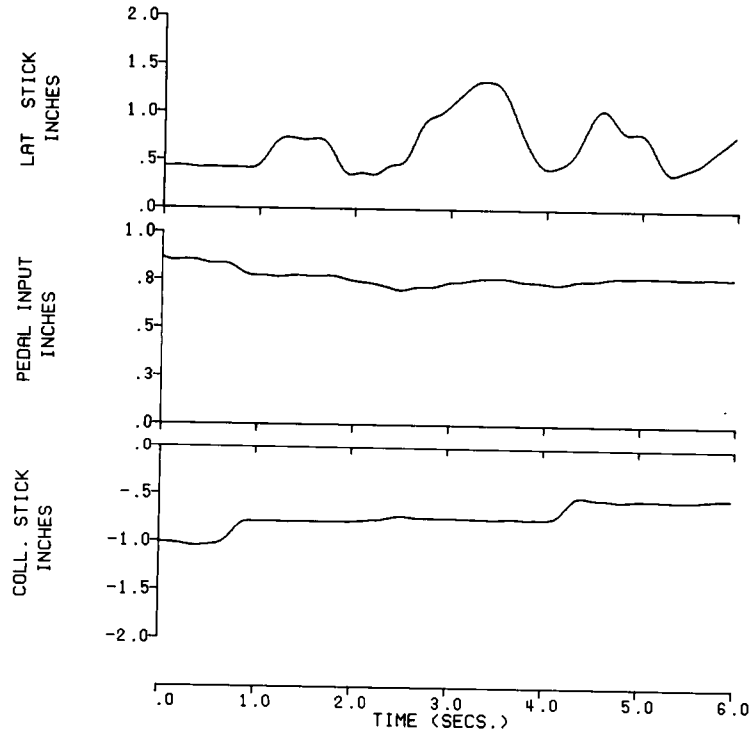


Figure 17. - Continued.

——— Flight Test Data Filtered at 3 HZ.



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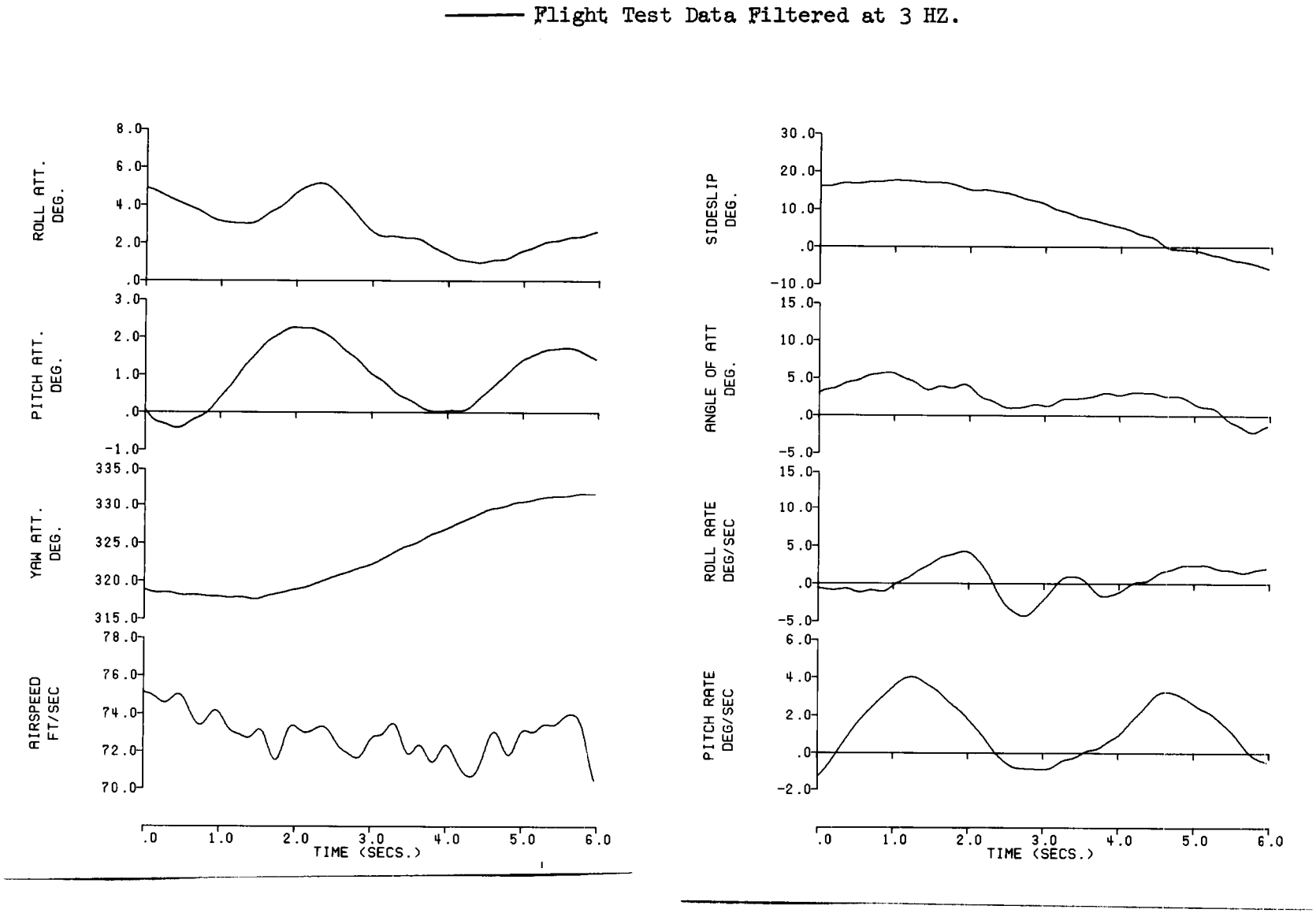


Figure 18. - Flight Test Data From CH-54B Filtered With A Digital Filter At 3 HZ. (45 knots, Maneuver 4).

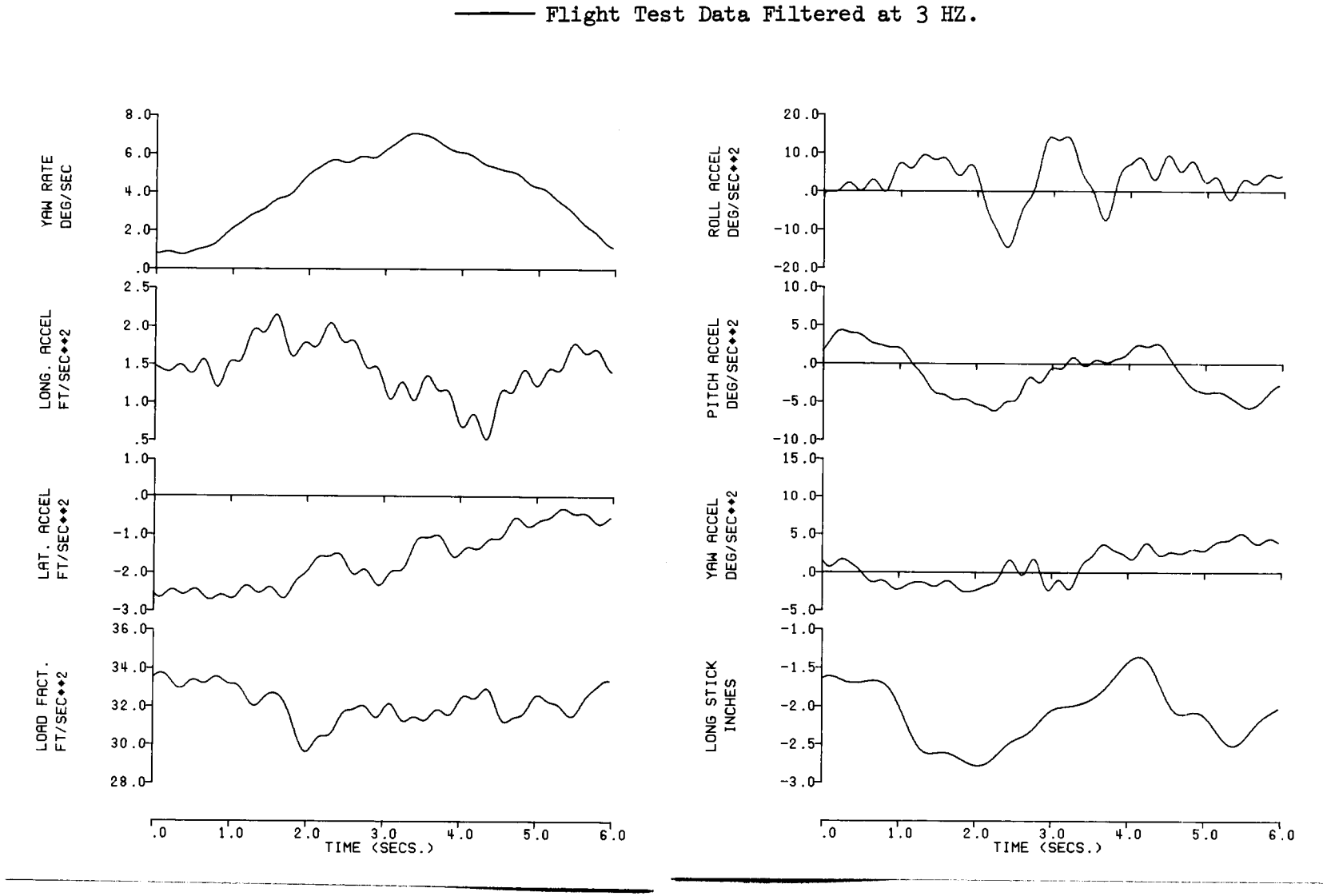
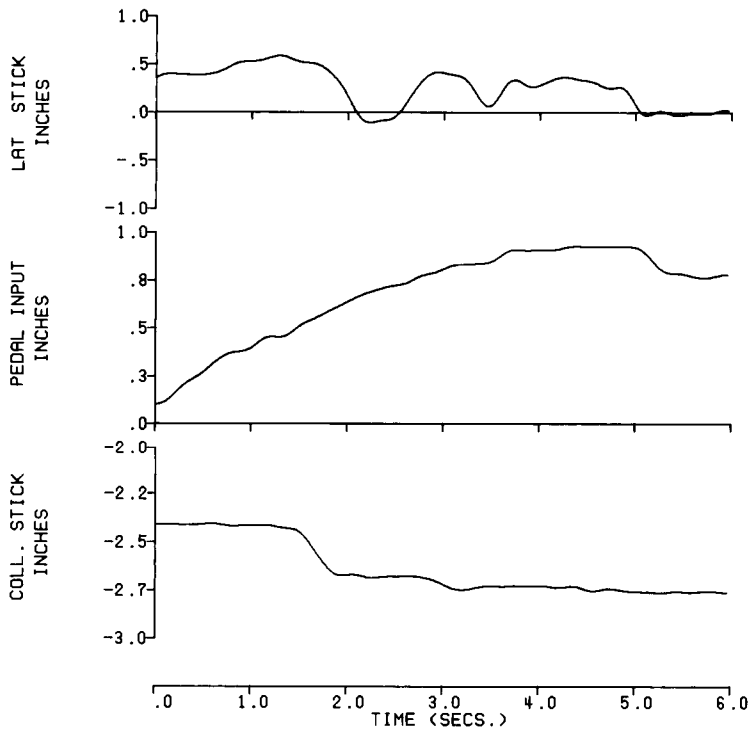


Figure 18. - Continued.

——— Flight Test Data Filtered at 3 HZ.



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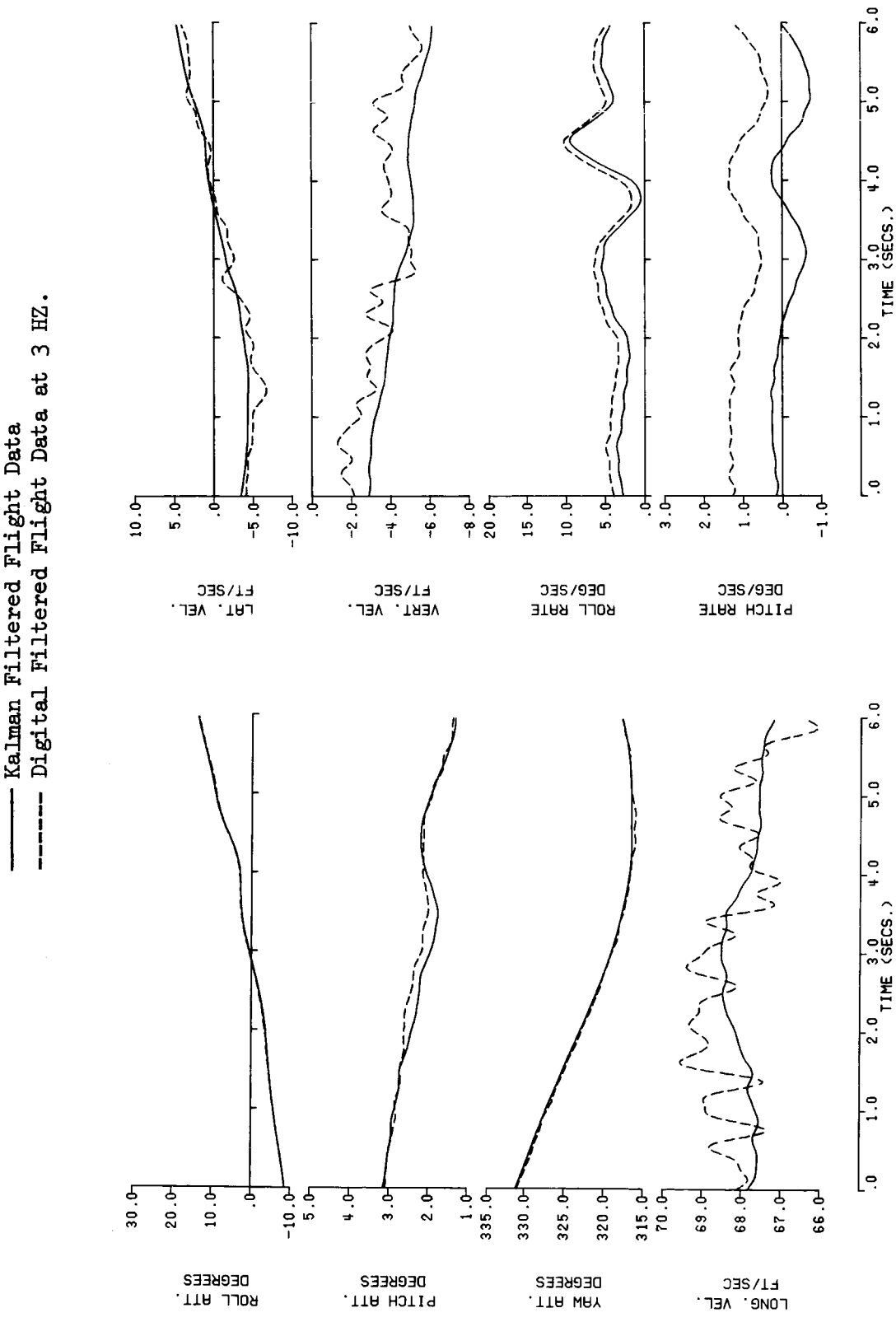


Figure 19. - Comparison of Flight Test Data From CH-54B Using the Kalman and Digital Filtering Methods (45 knots, Maneuver 1).

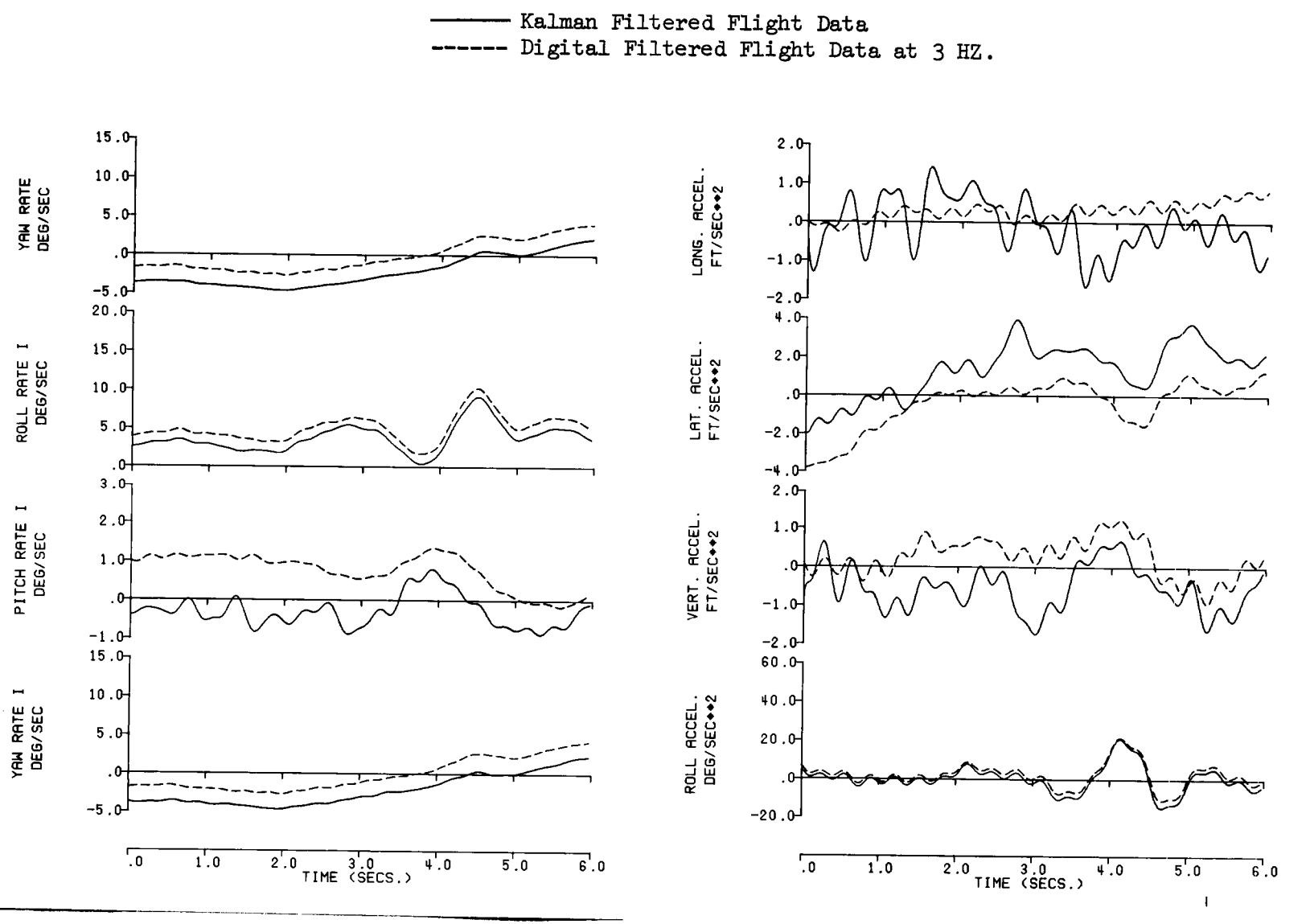


Figure 19. - Continued.

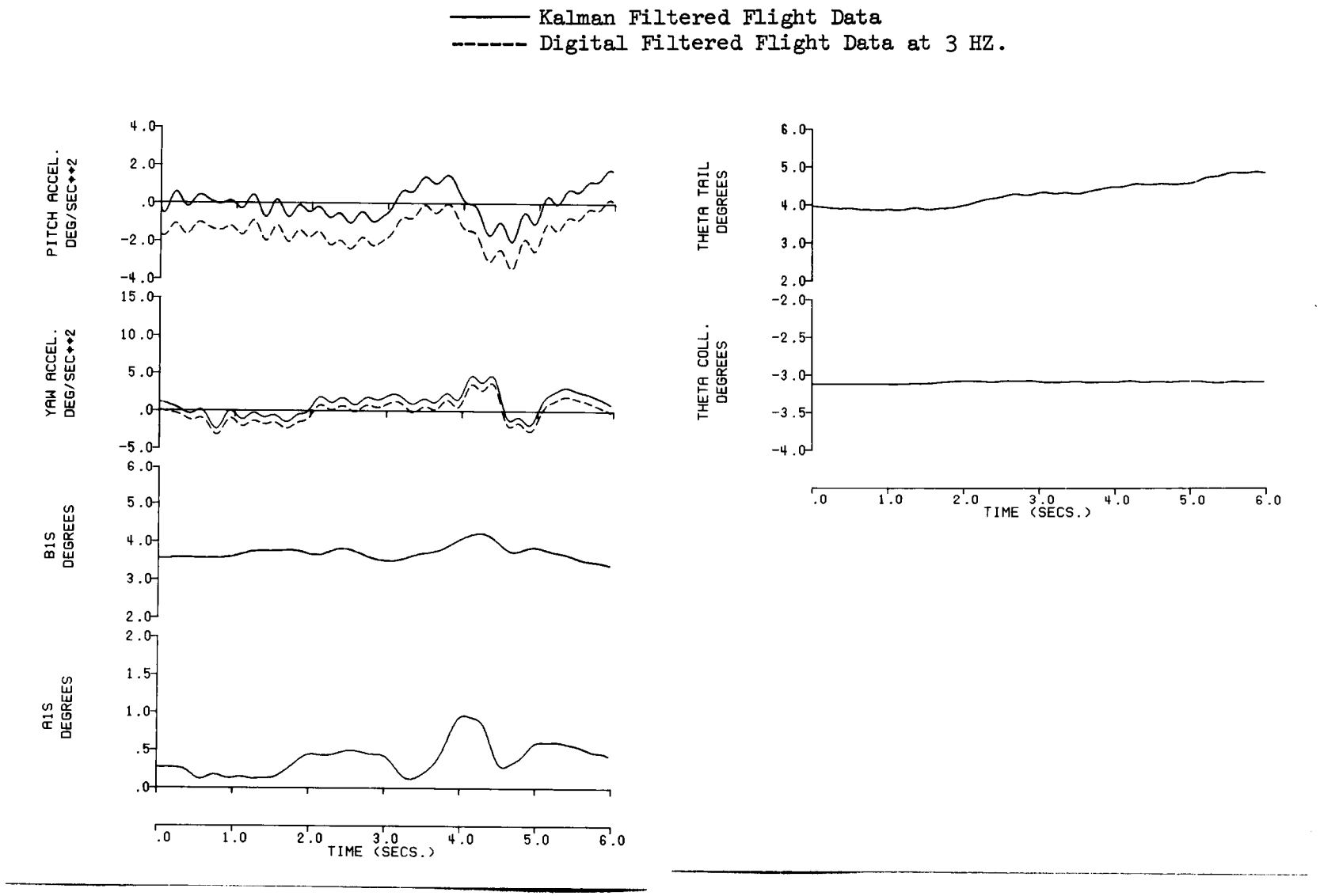


Figure 19. - Concluded.

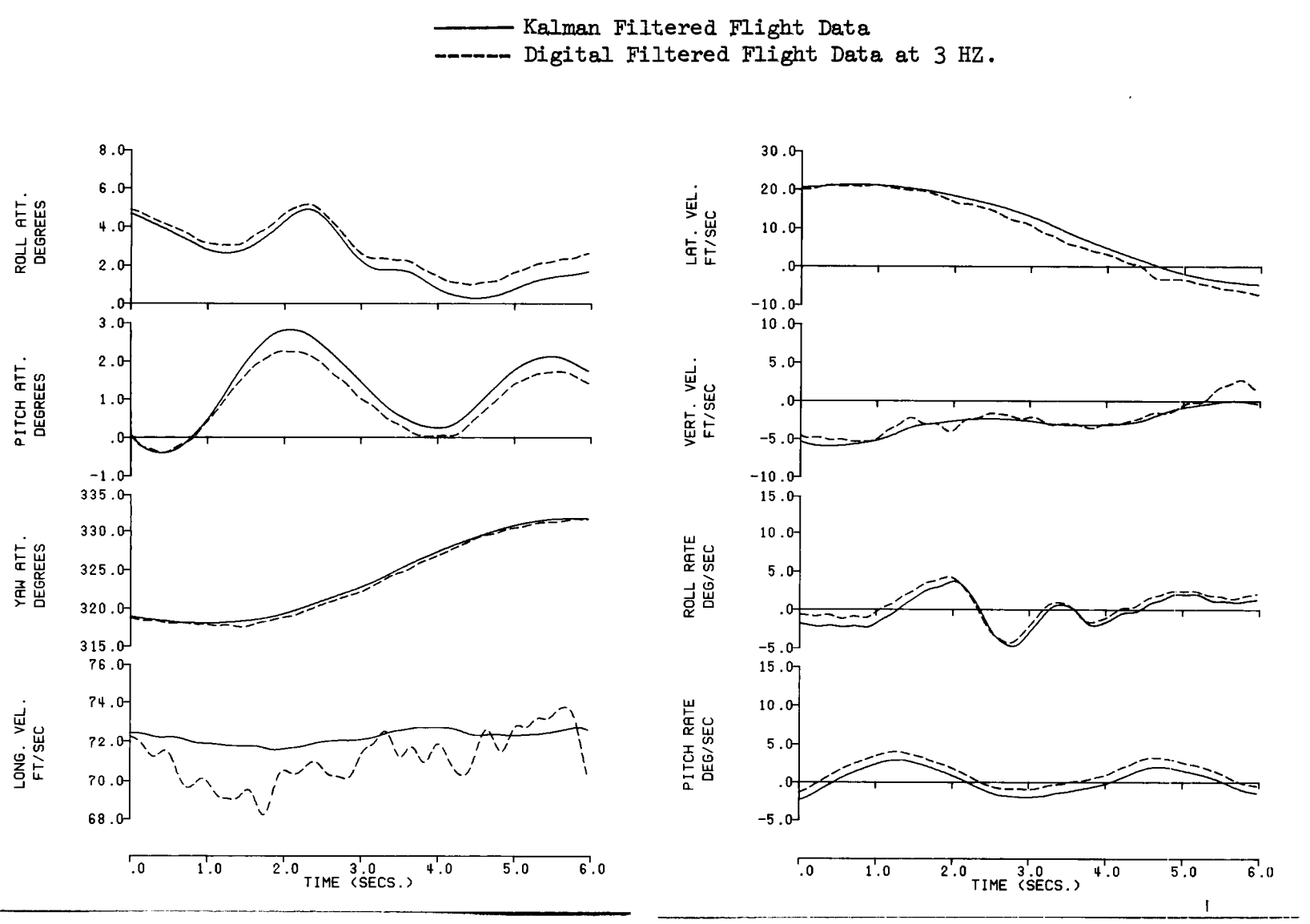


Figure 20. - Comparison of Flight Test Data From CH-54B Using the Kalman and Digital Filtering Methods (45 knots, Maneuver 4).

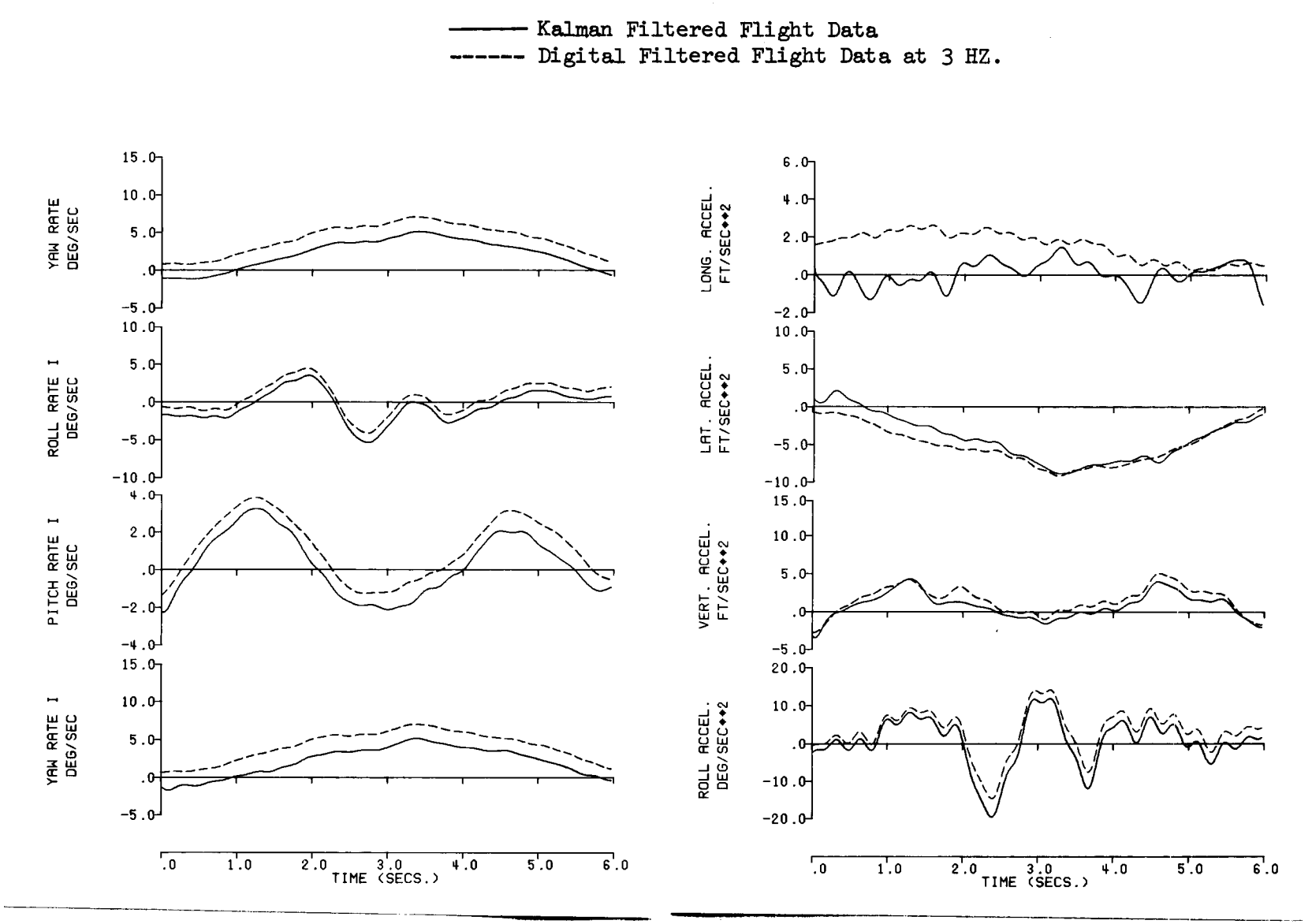
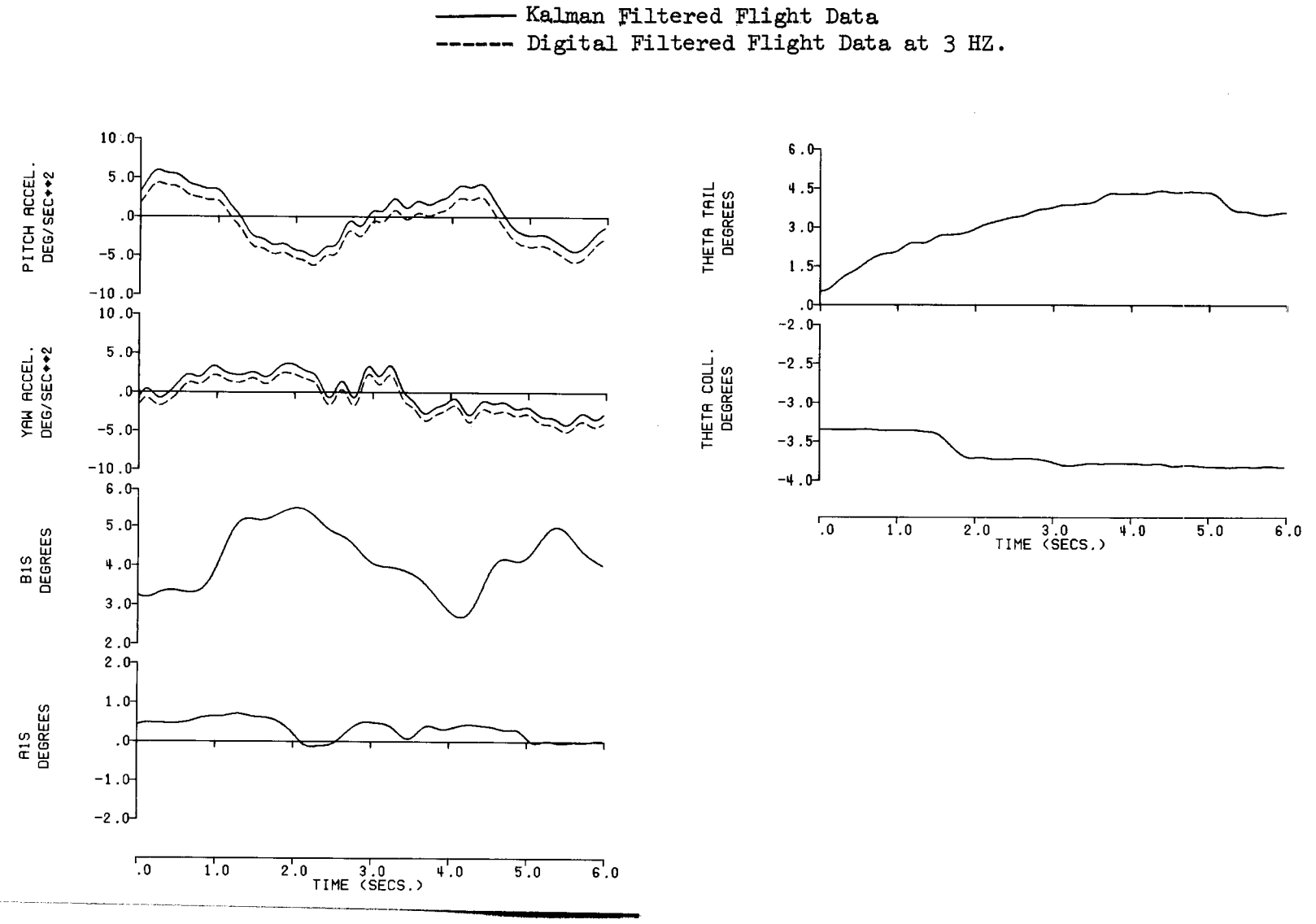


Figure 20. - Continued.



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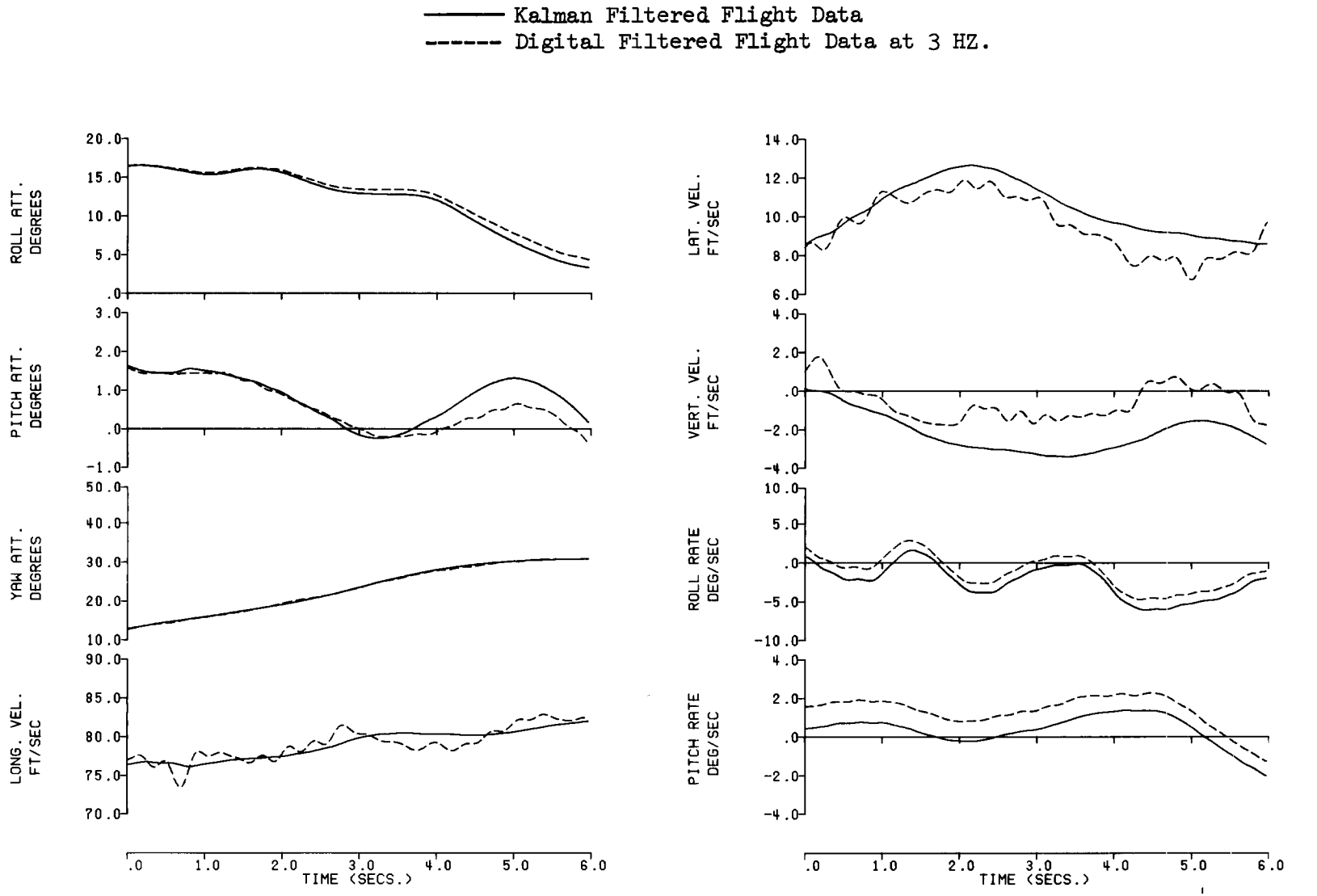


Figure 21. - Comparison of Flight Test Data From CH-54B Using the Kalman and Digital Filtering Methods (45 knots, Maneuver 2).

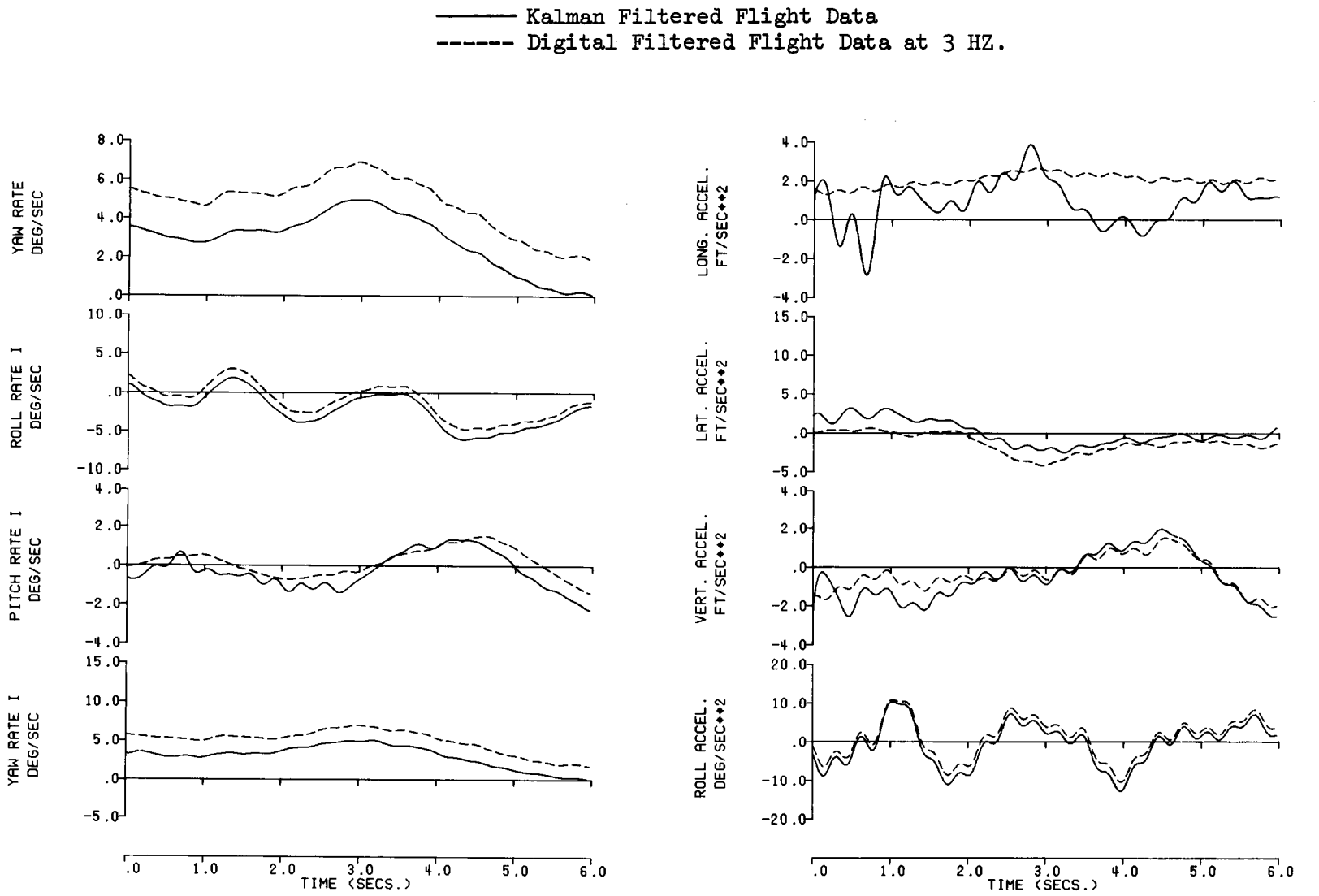


Figure 21. - Continued.

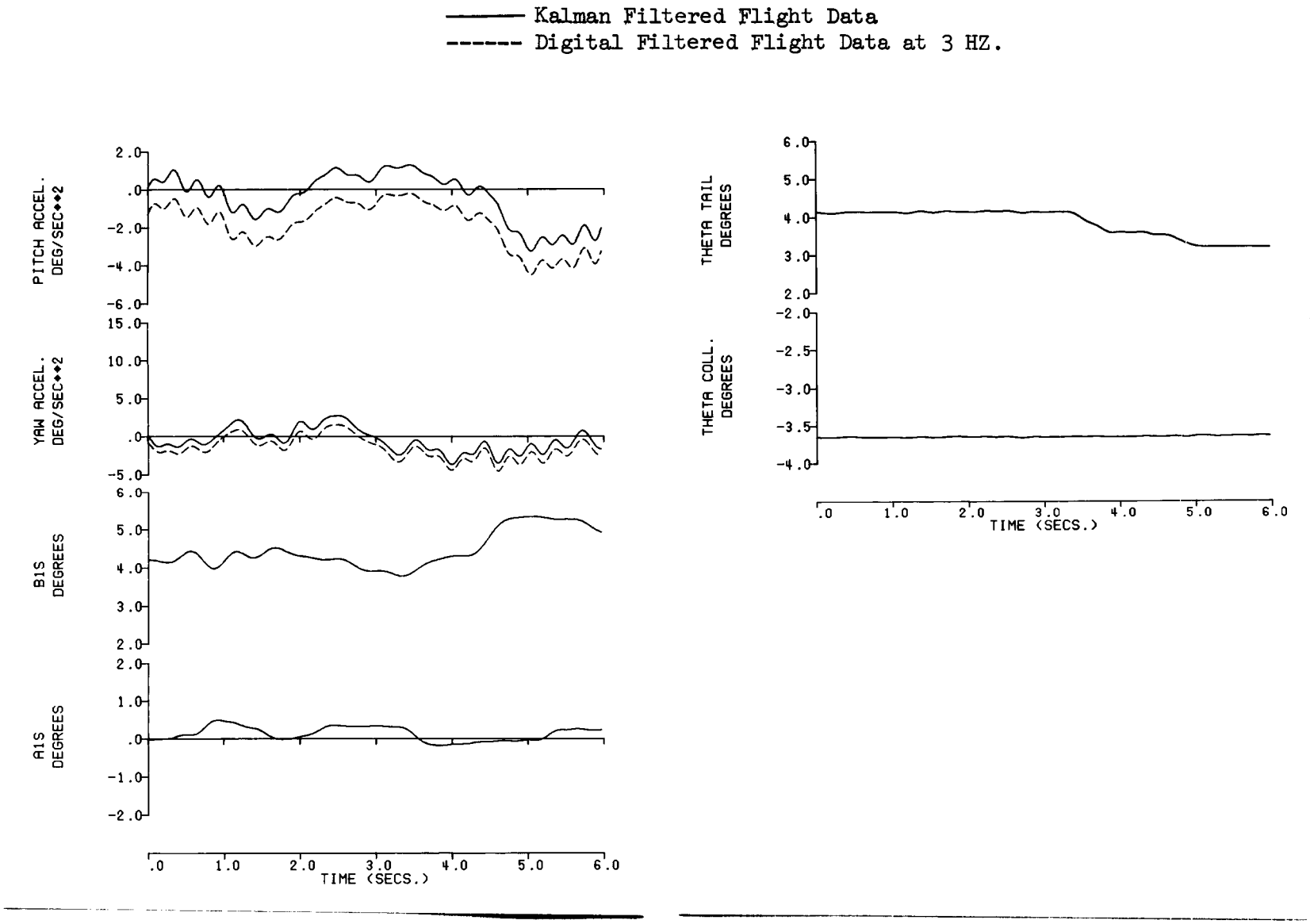


Figure 21. - Concluded.

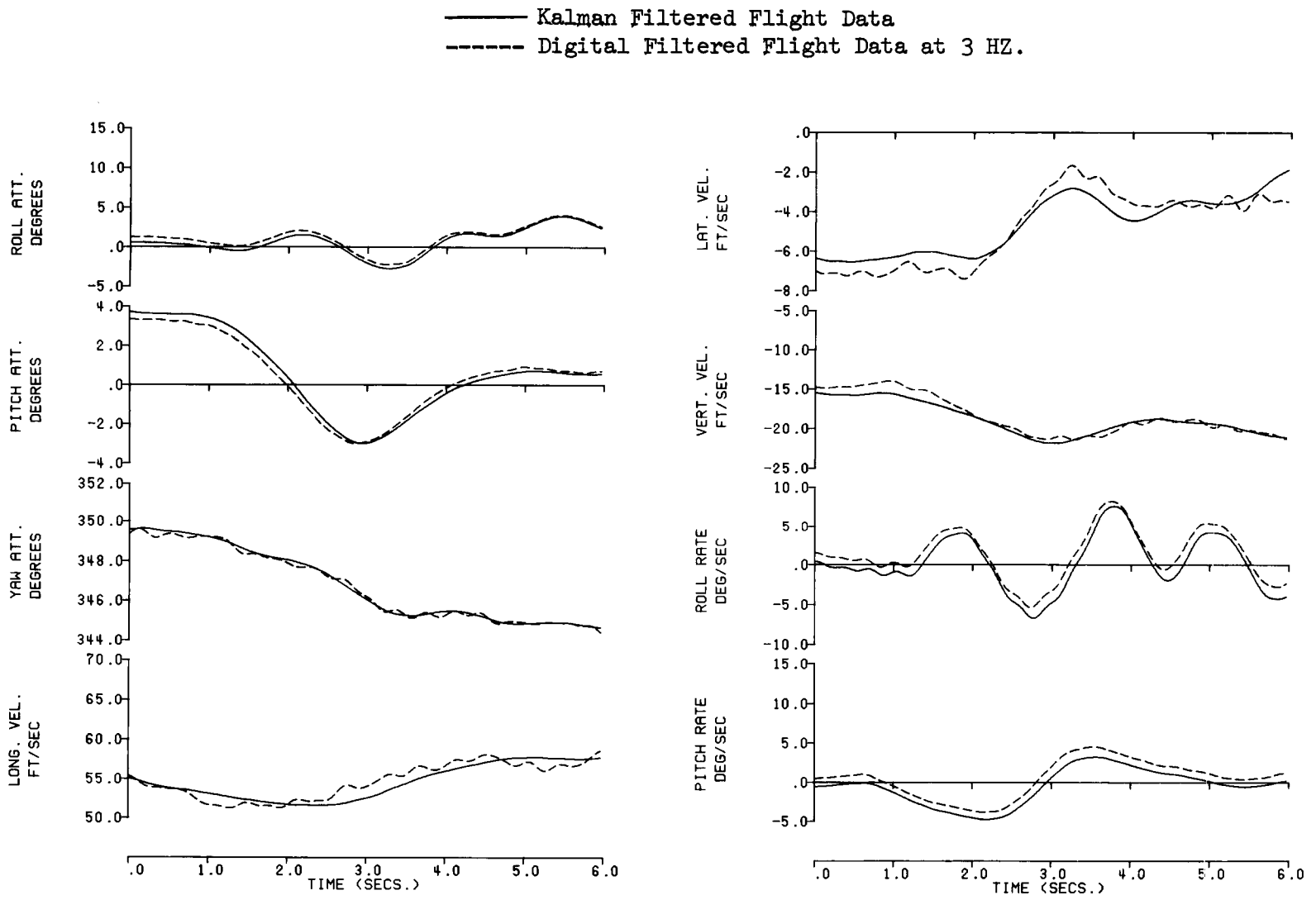
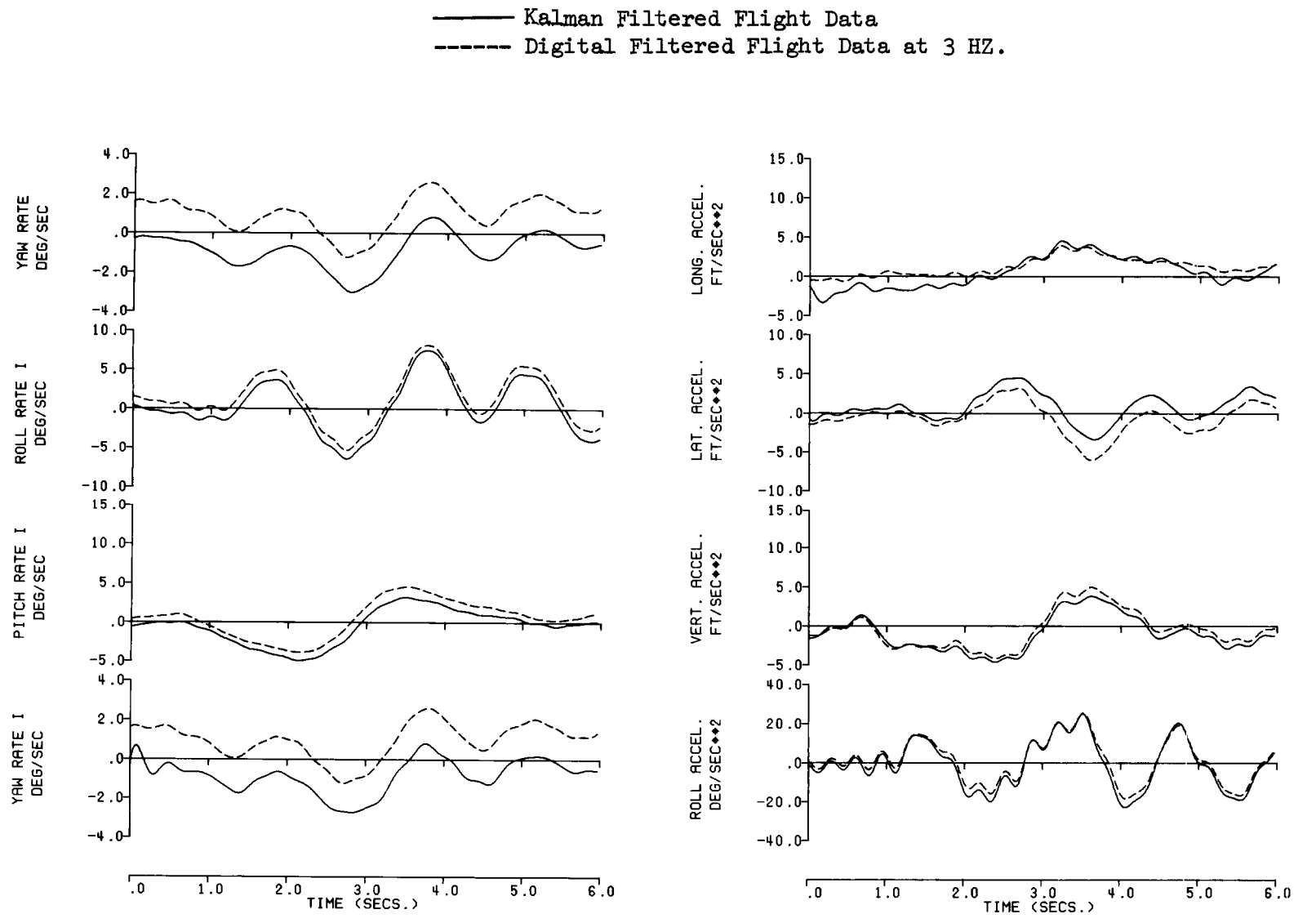


Figure 22. - Comparison of Flight Test Data From CH-54B Using the Kalman and Digital Filtering Methods (45 knots, Maneuver 3).



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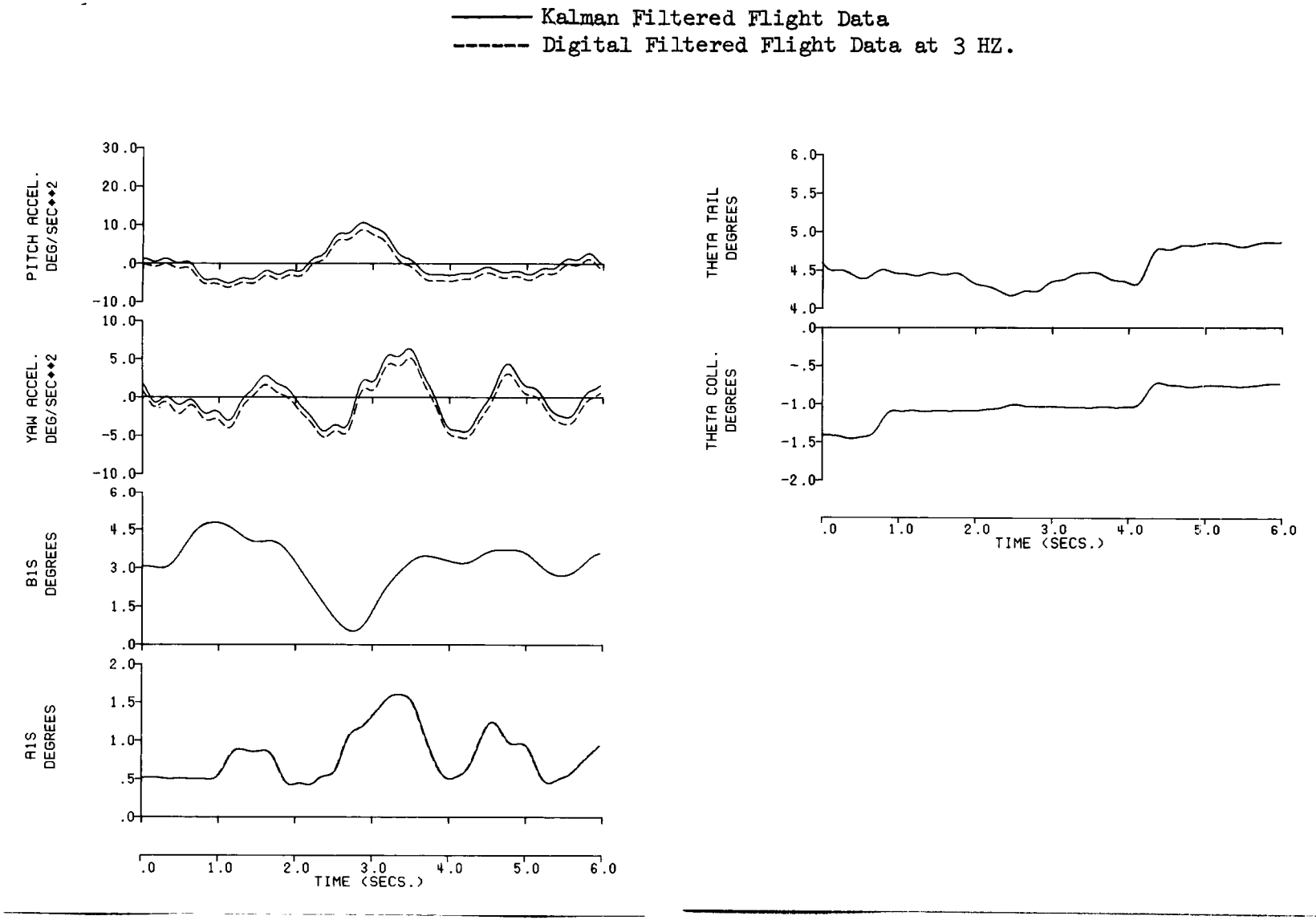

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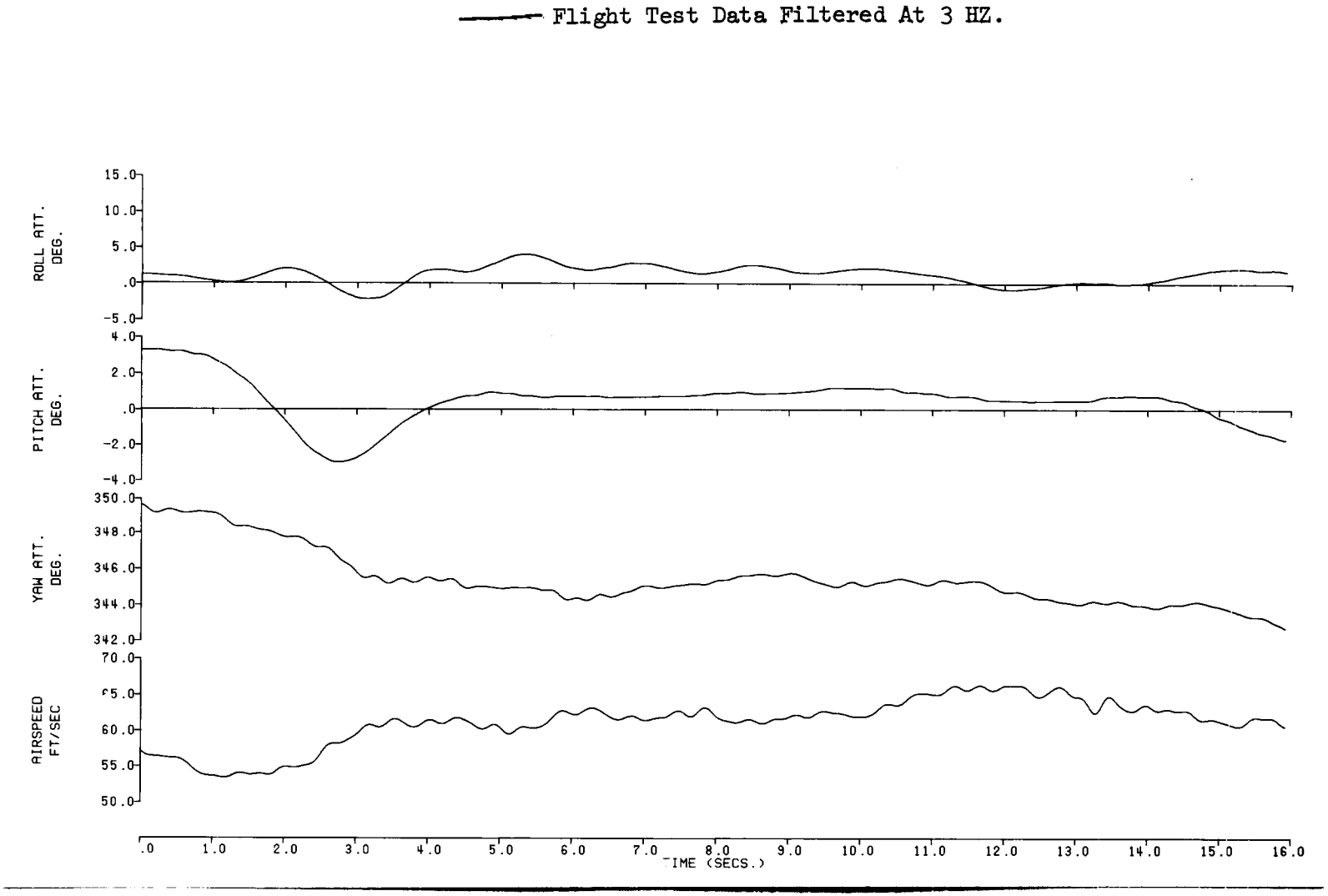


Figure 23. - Flight Test Data From CH-54B Filtered With a Digital Filter at 3 HZ. (45 knots, 16 sec. Maneuver).

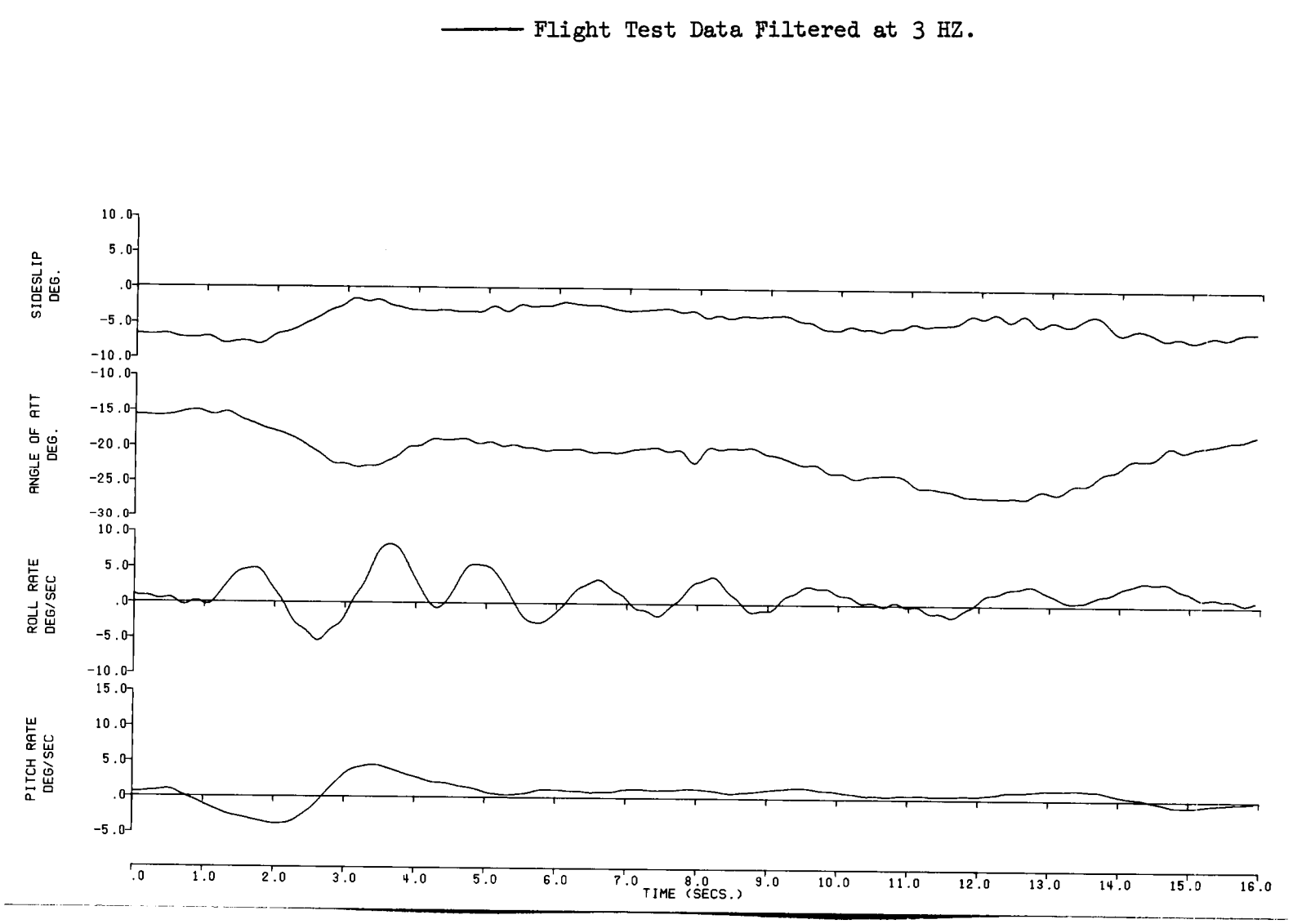


Figure 23. - Continued.

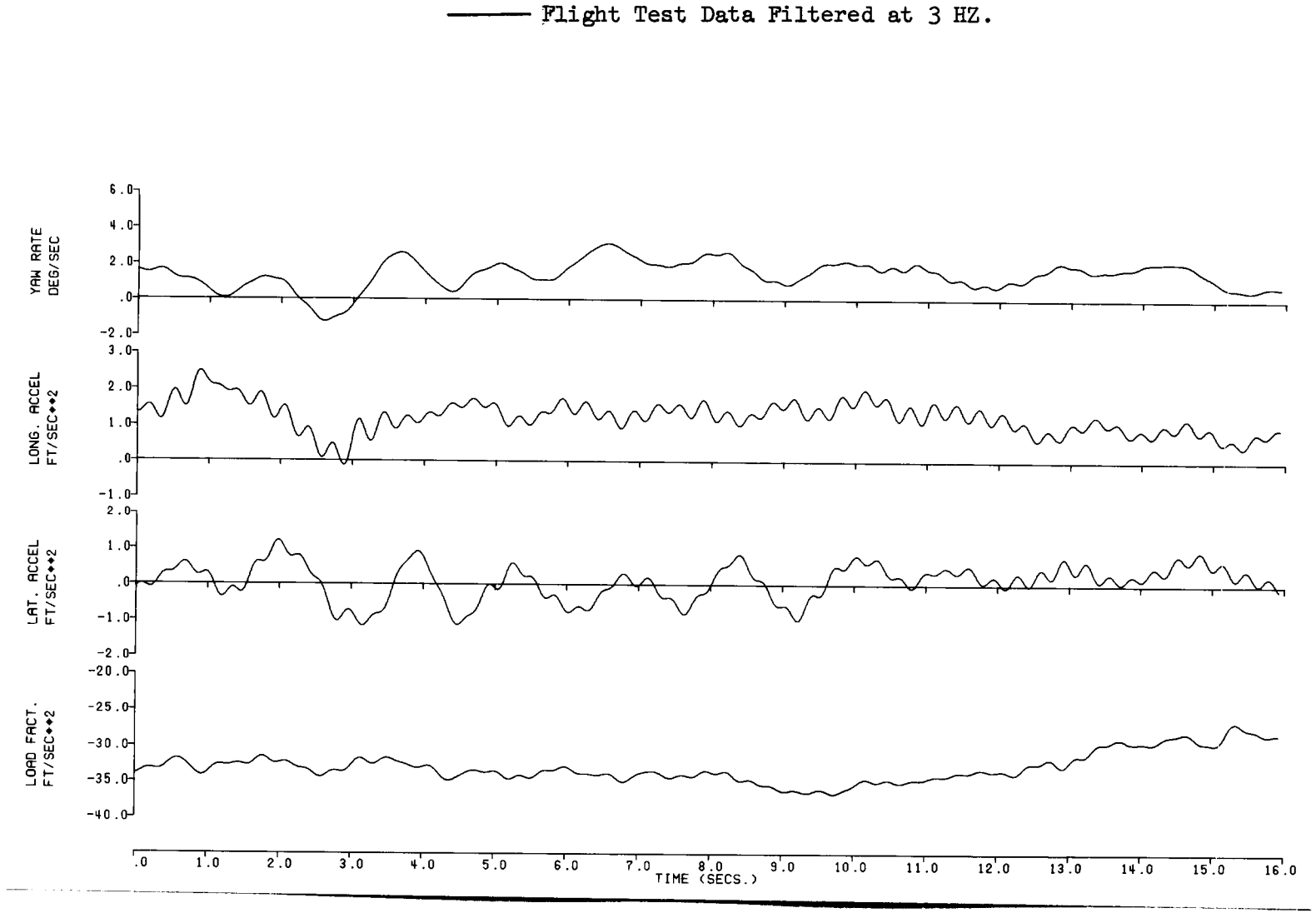


Figure 23. - Continued.

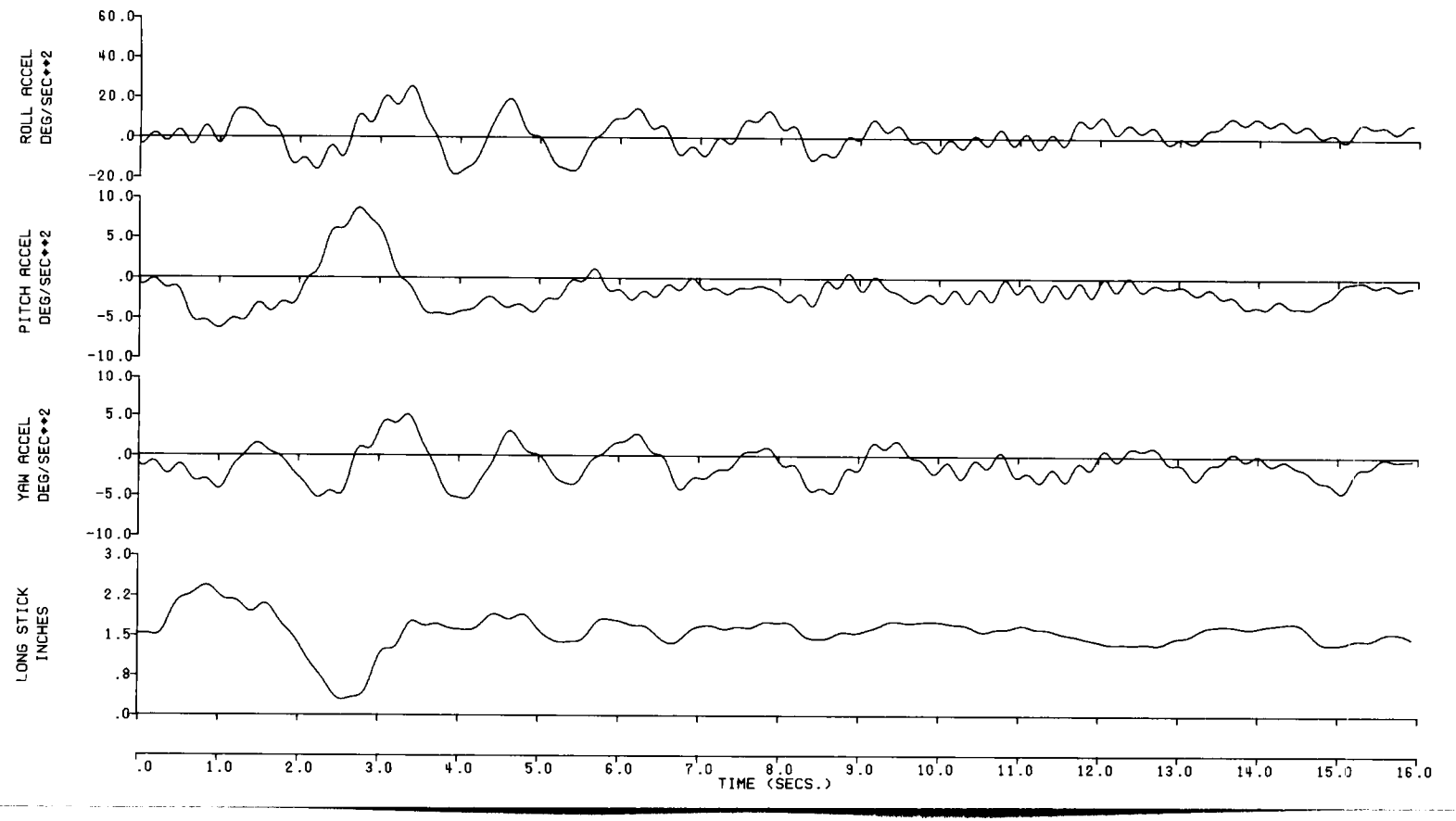


Figure 23. - Continued.

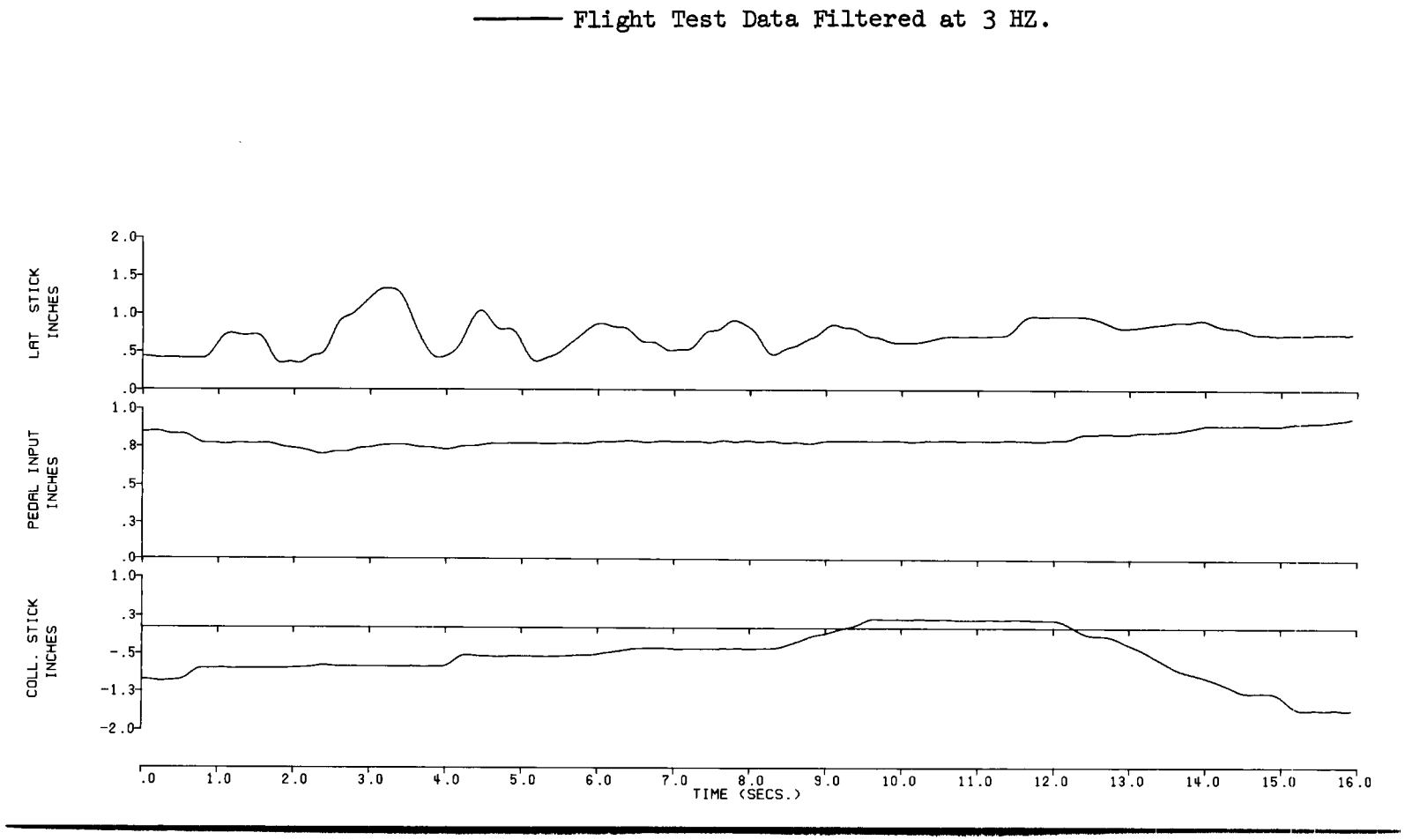


Figure 23. - Concluded.

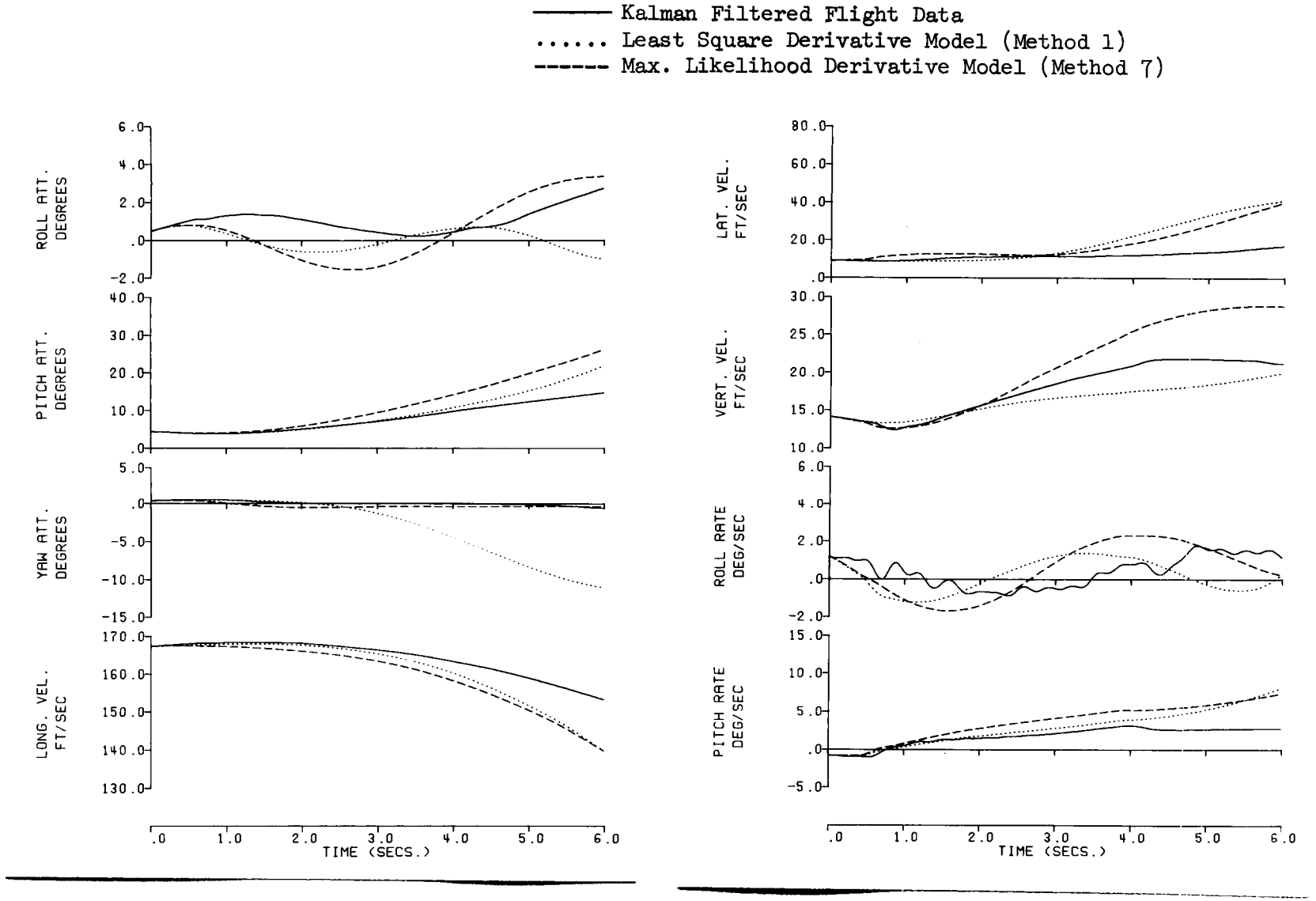


Figure 24. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 1).

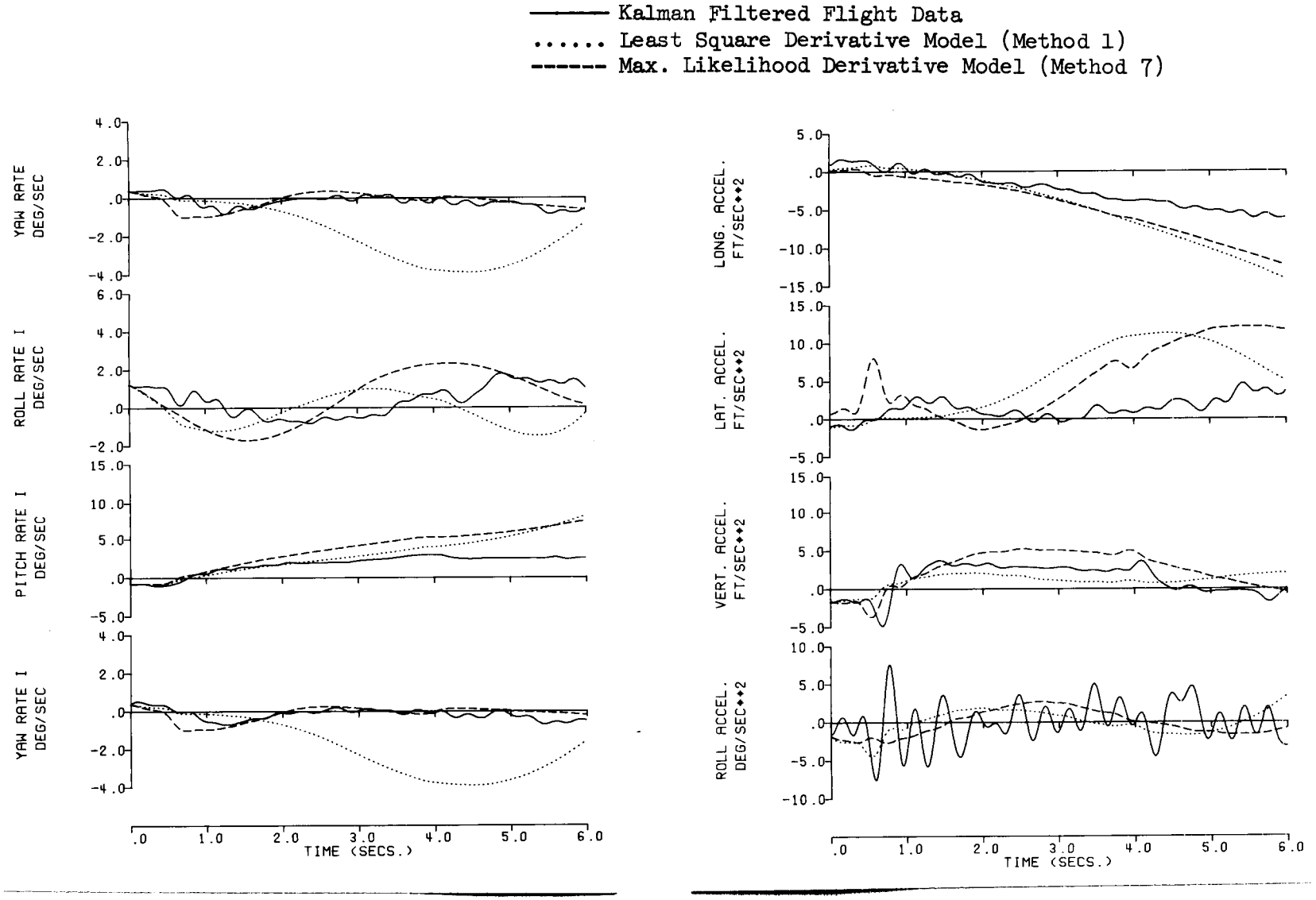
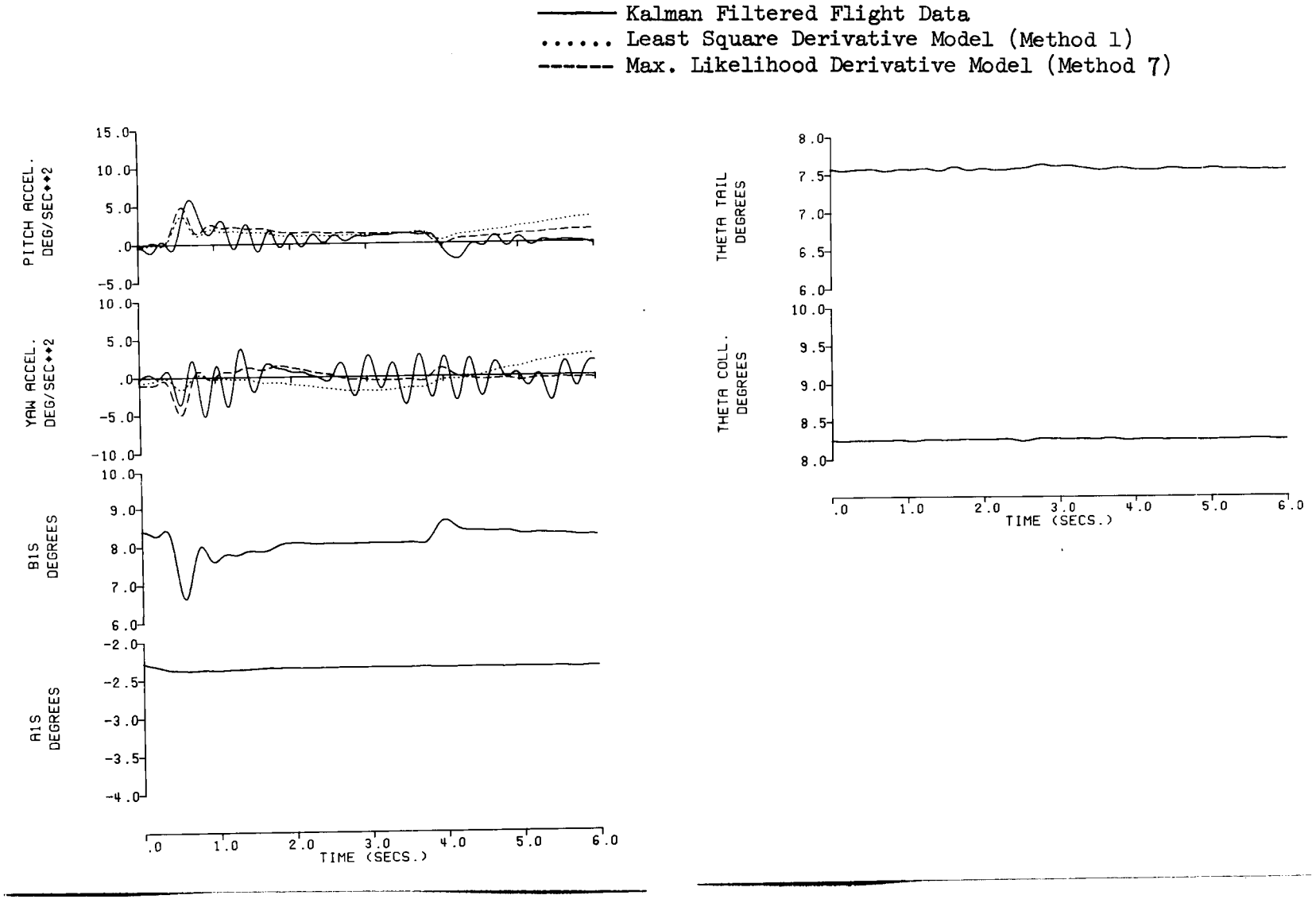


Figure 24. - Continued.



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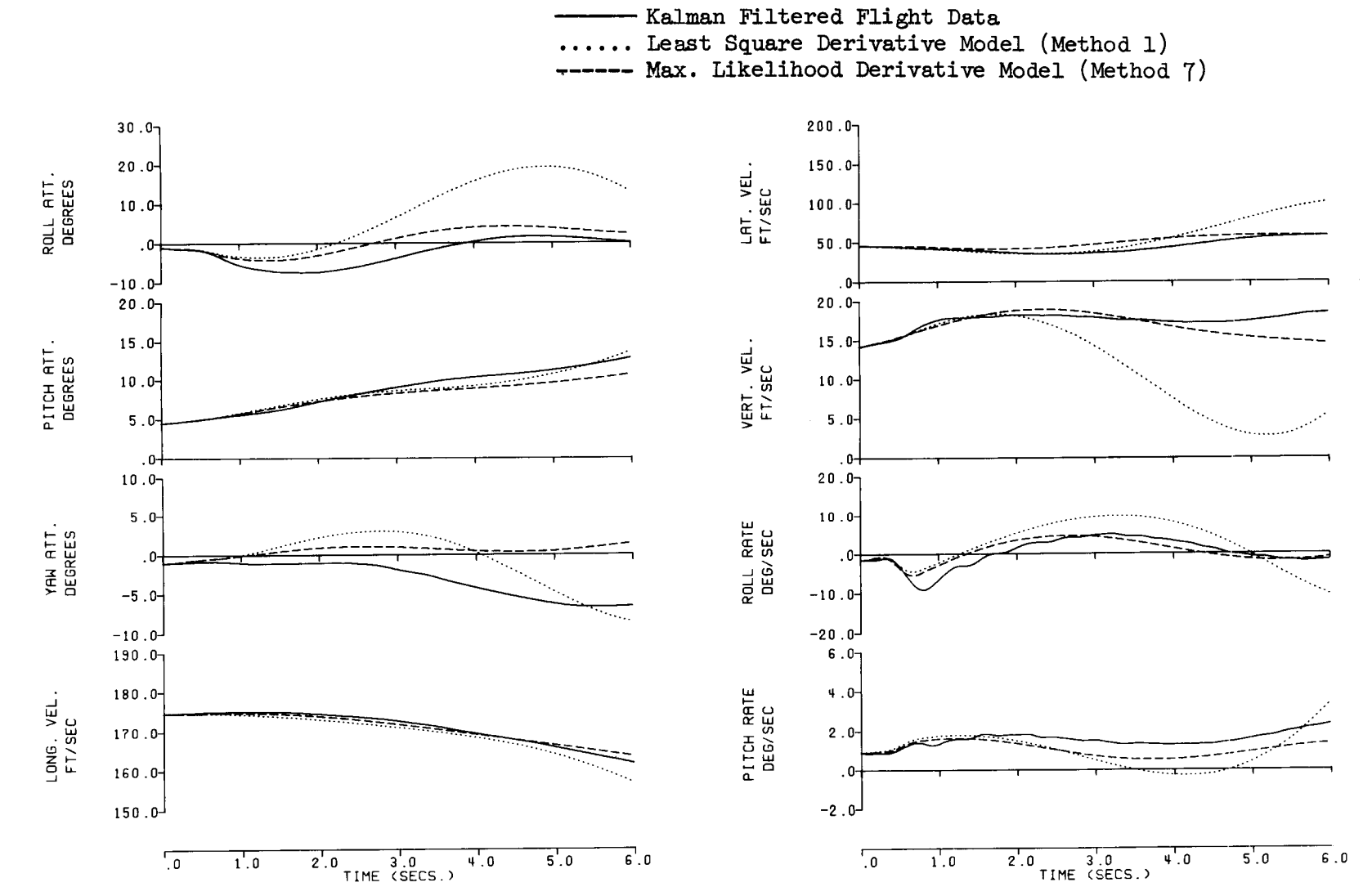


Figure 25. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 2).

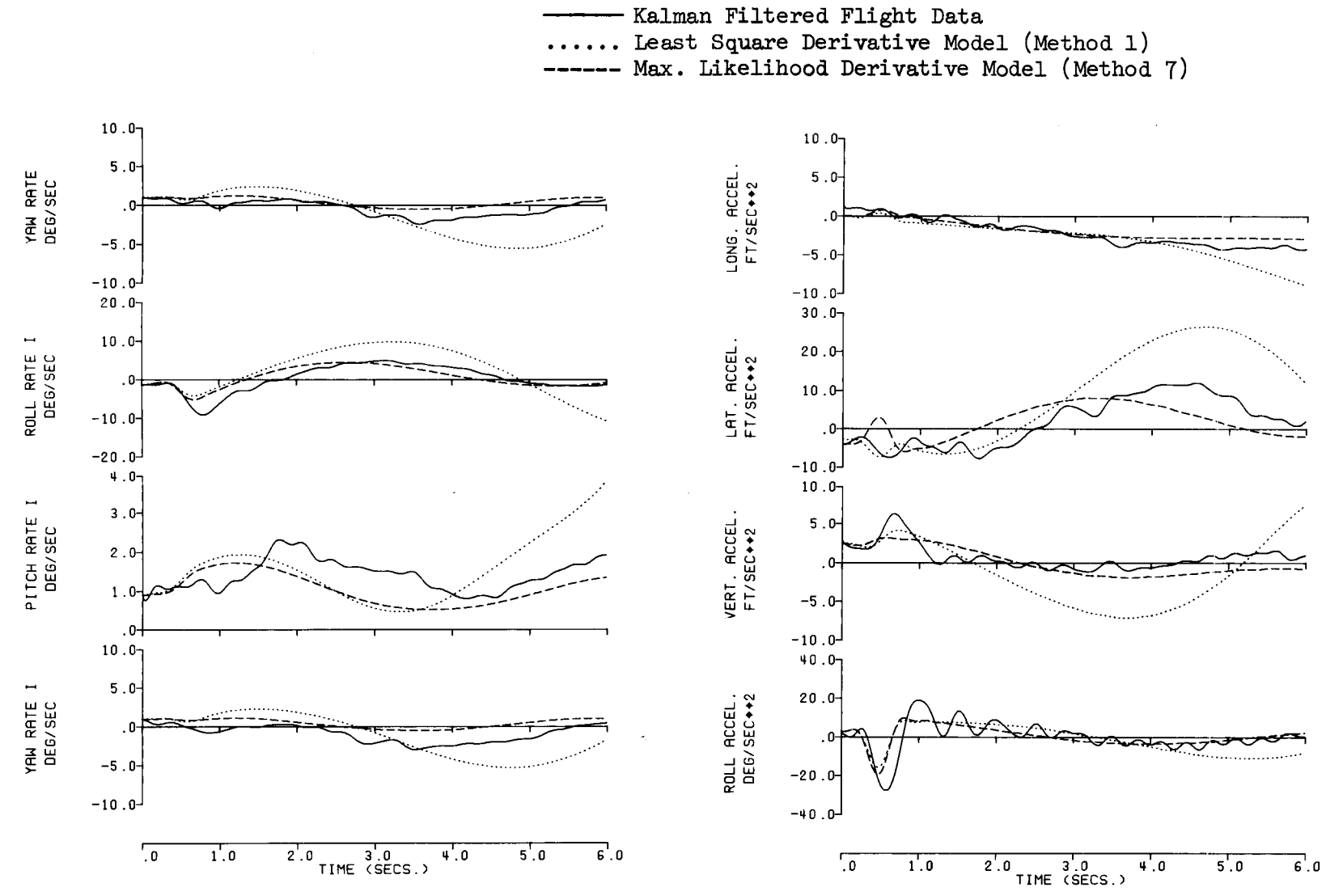


Figure 25. - Continued.

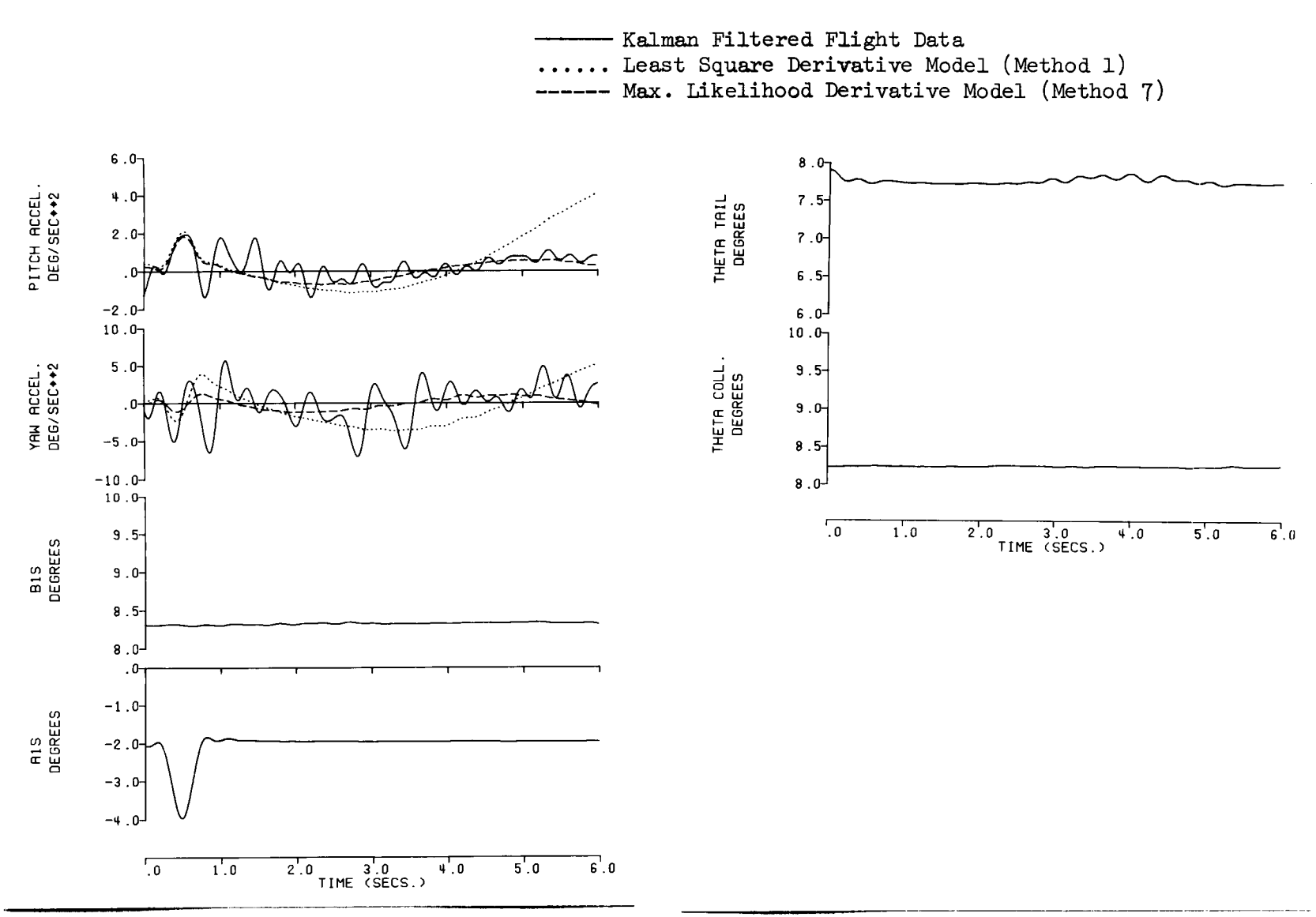


Figure 25. - Concluded.

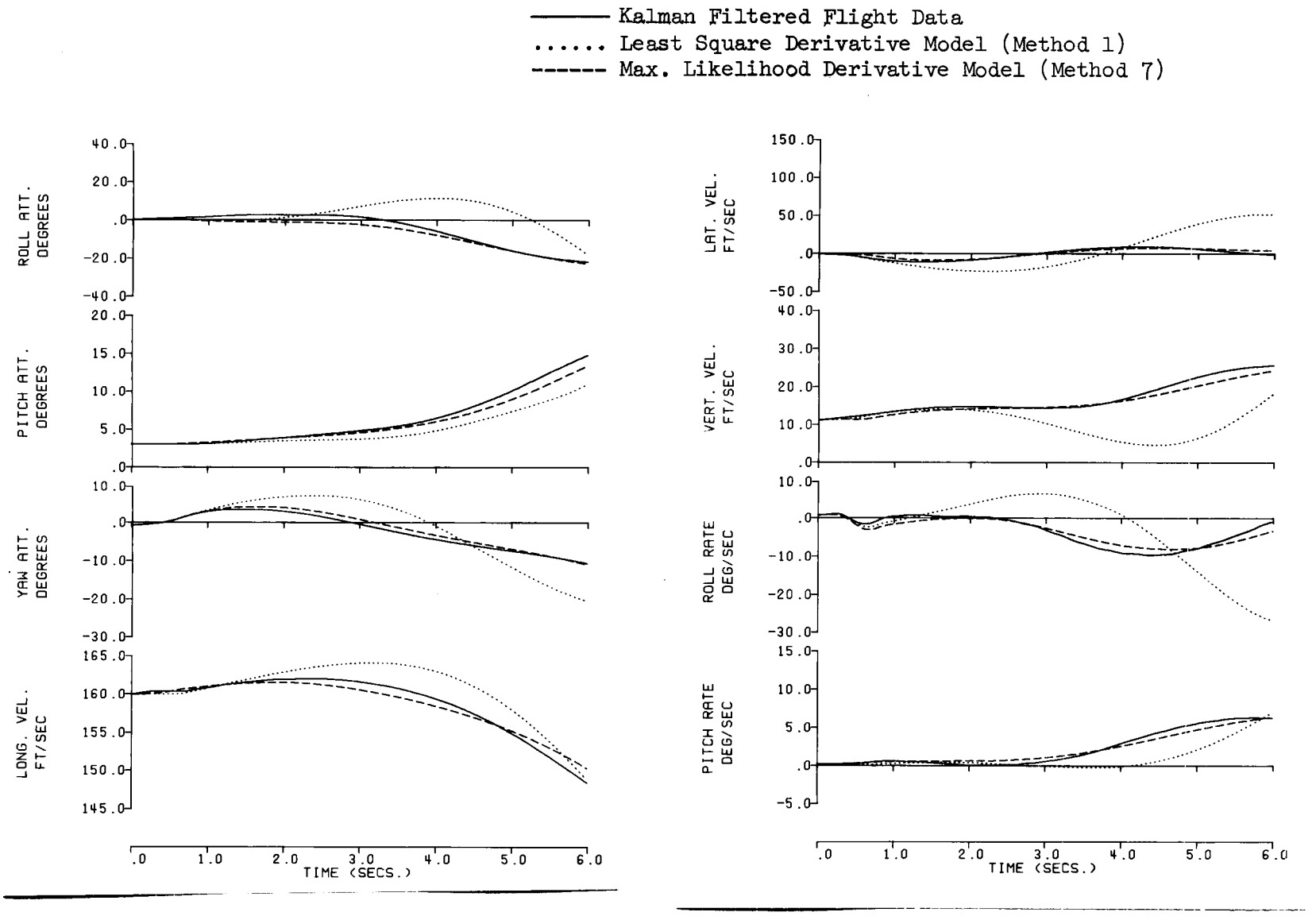


Figure 26. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 3).

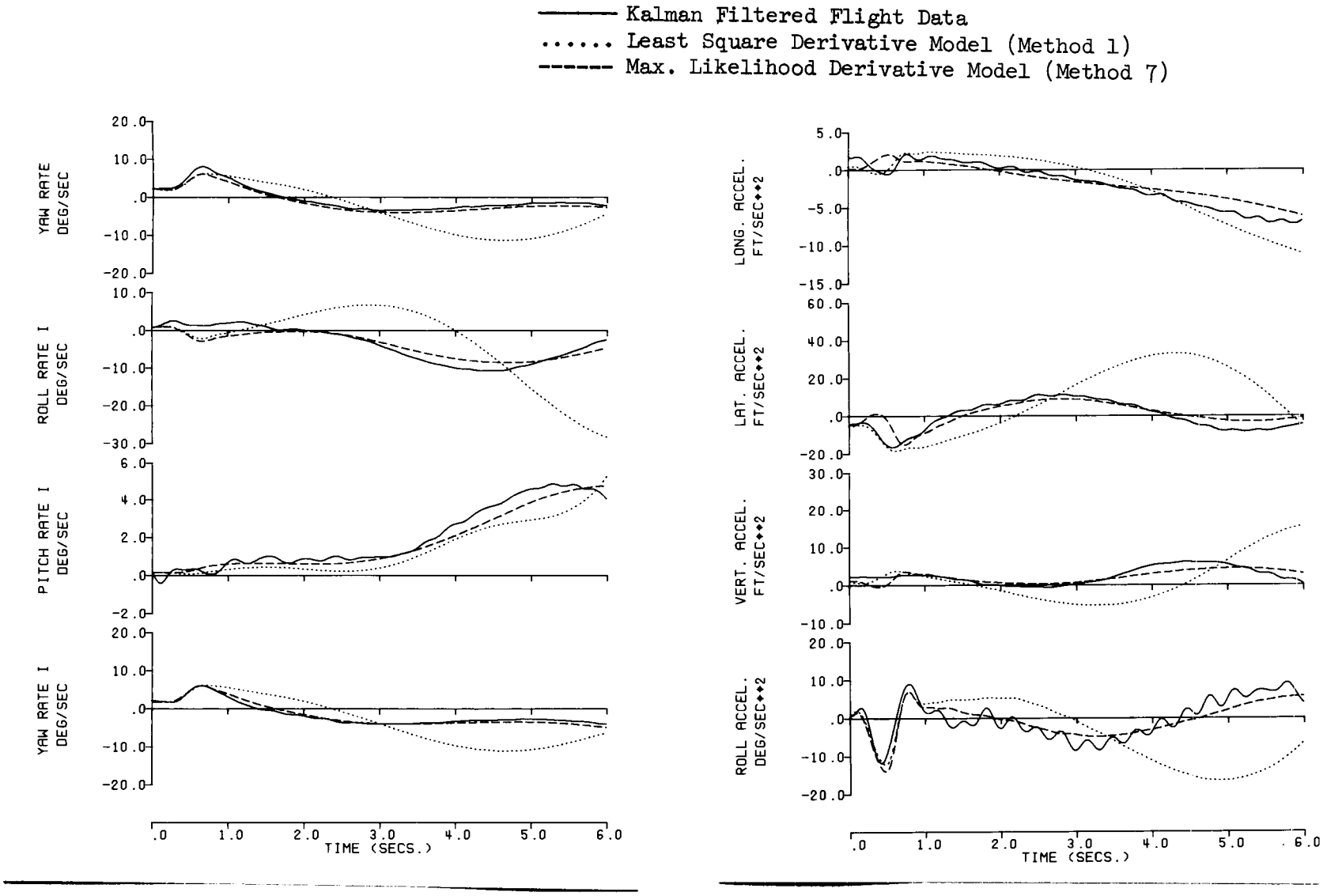


Figure 26. - Continued.

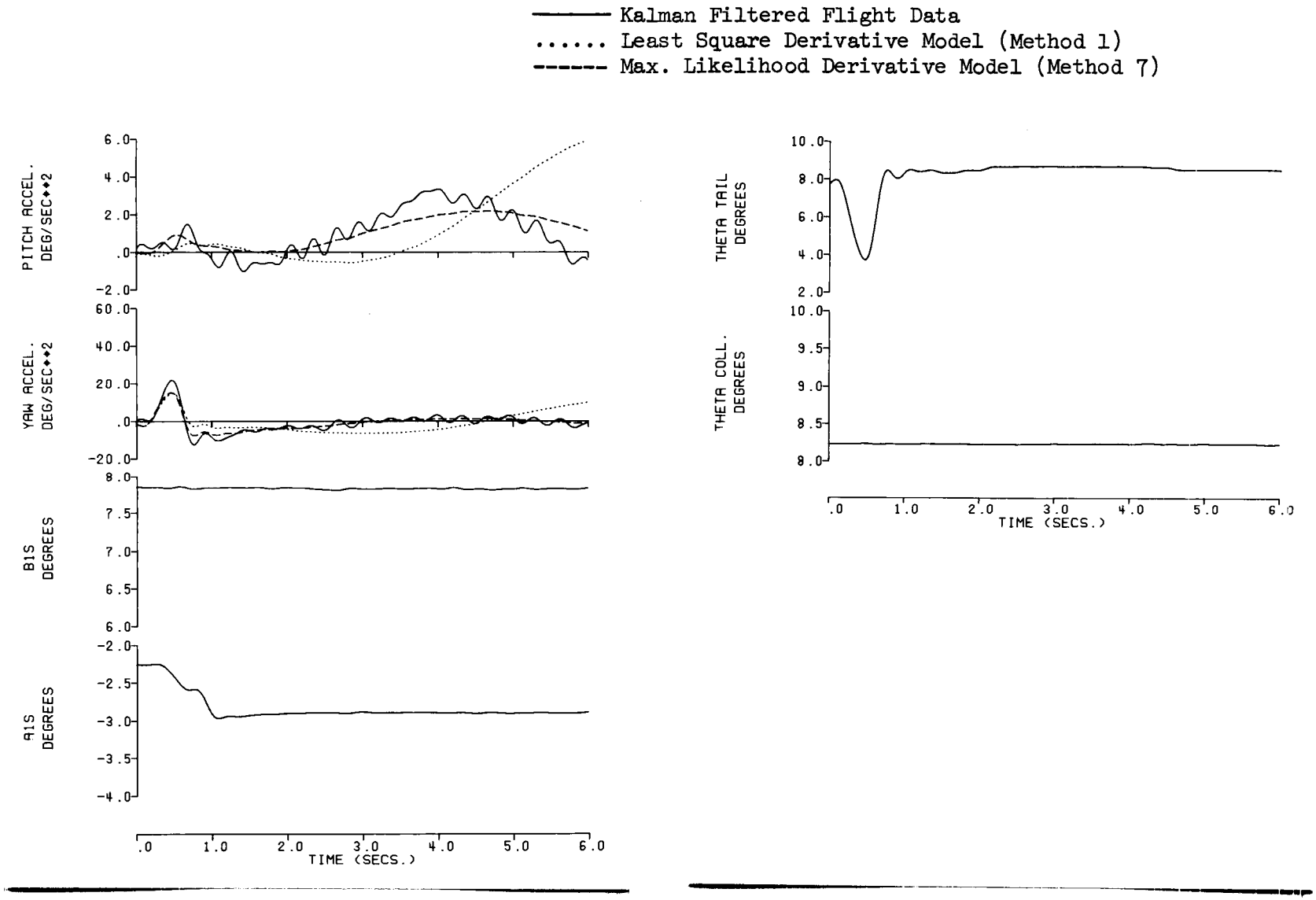


Figure 26. - Concluded.

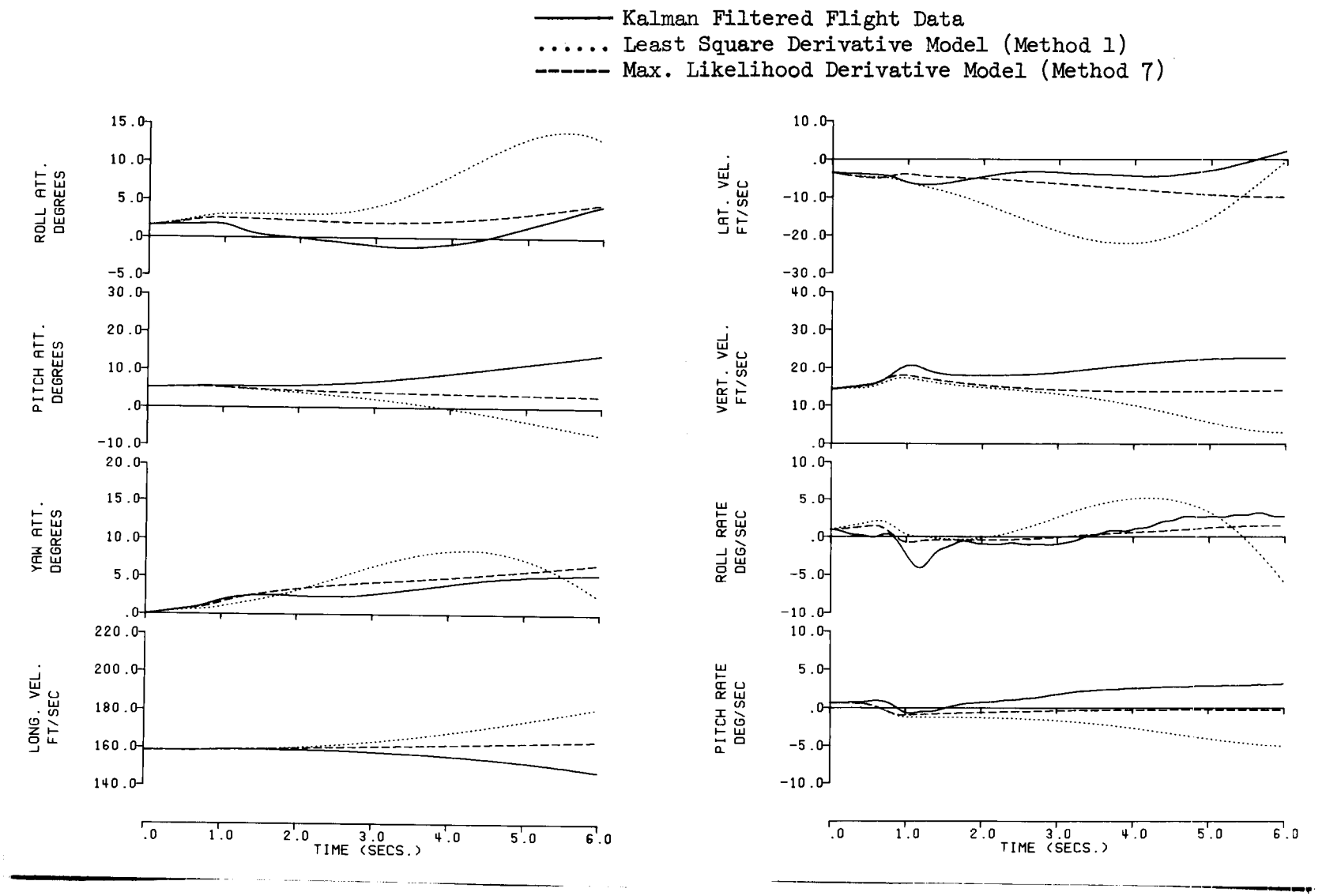


Figure 27. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 4).

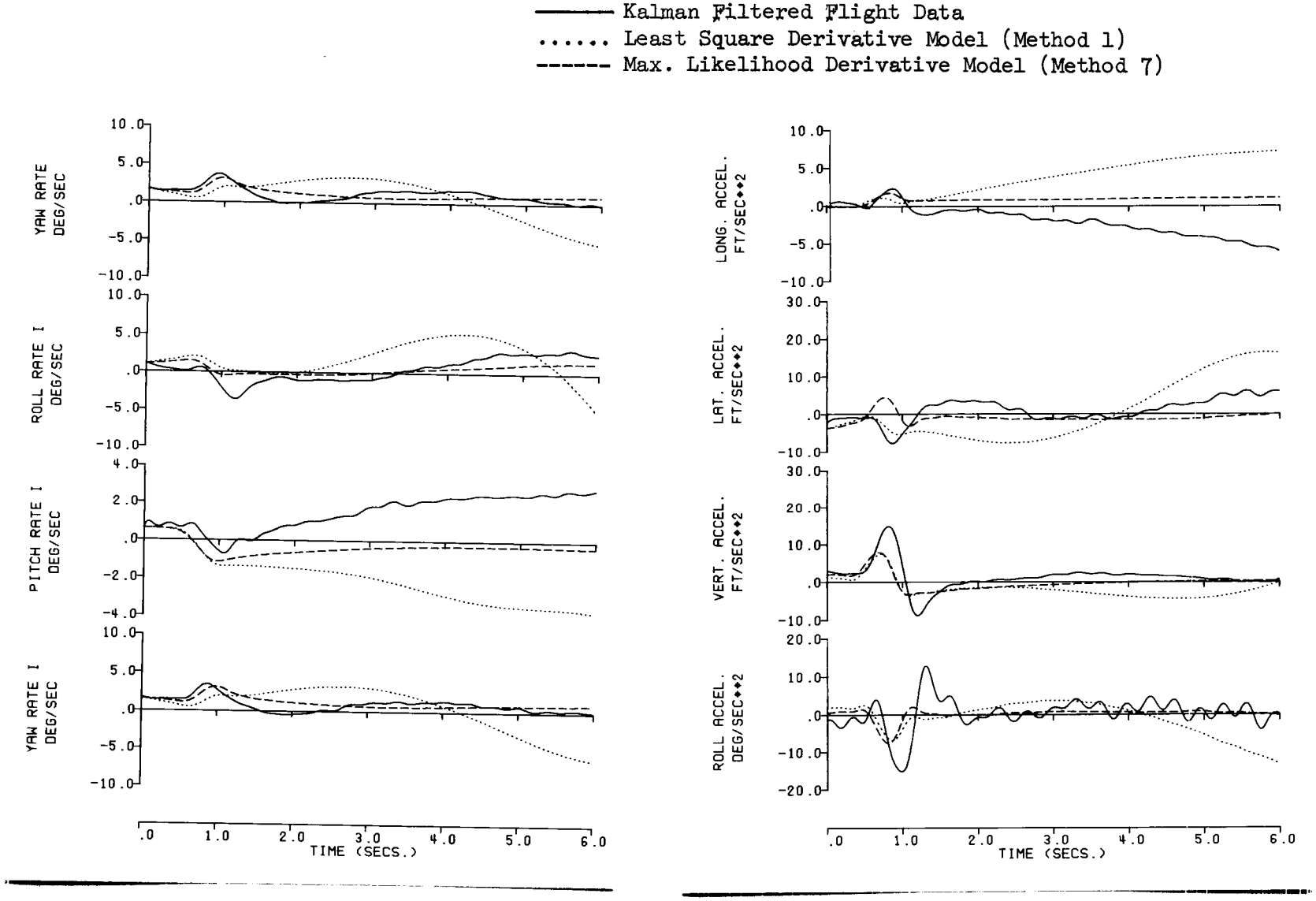
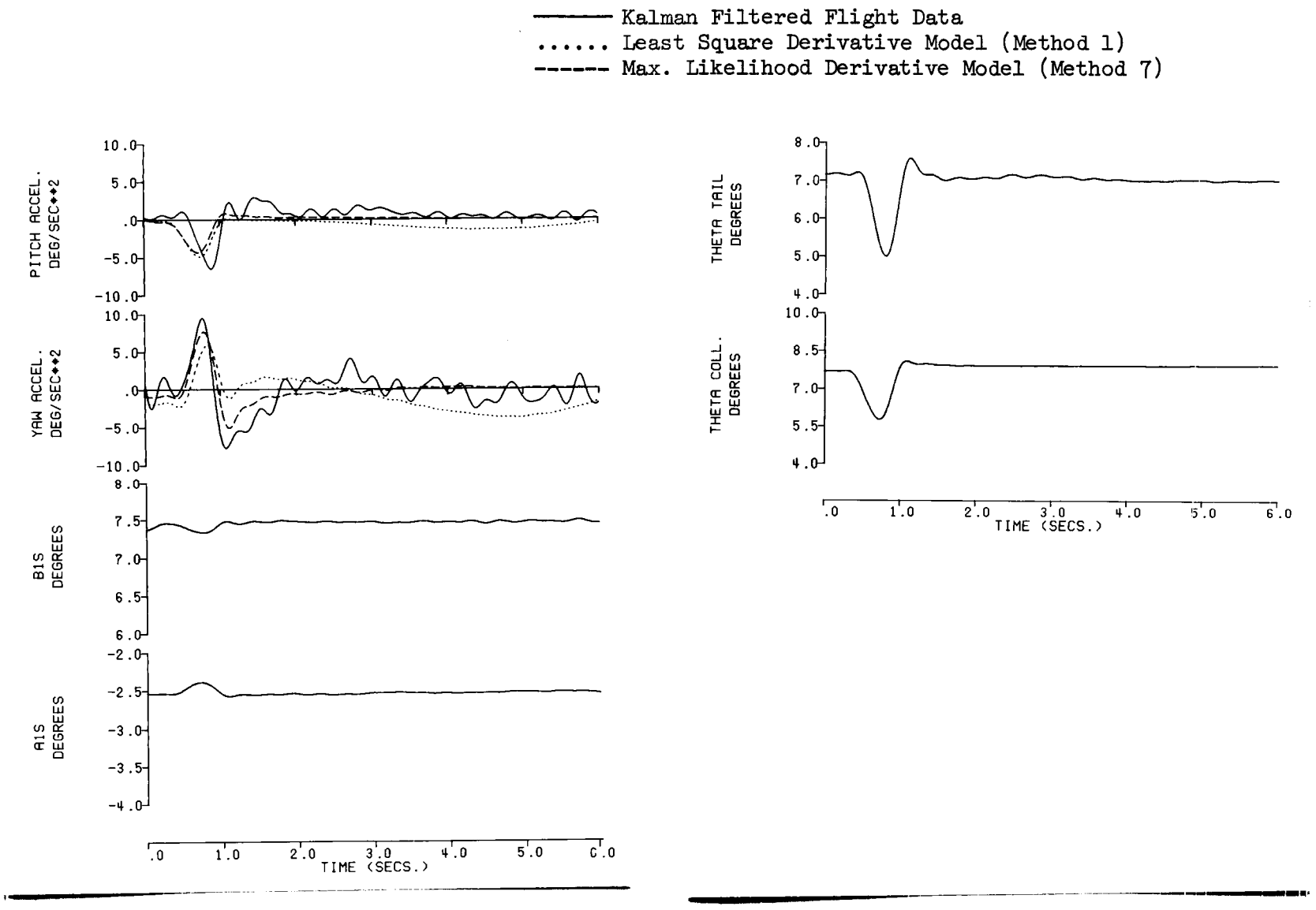


Figure 27. - Continued.



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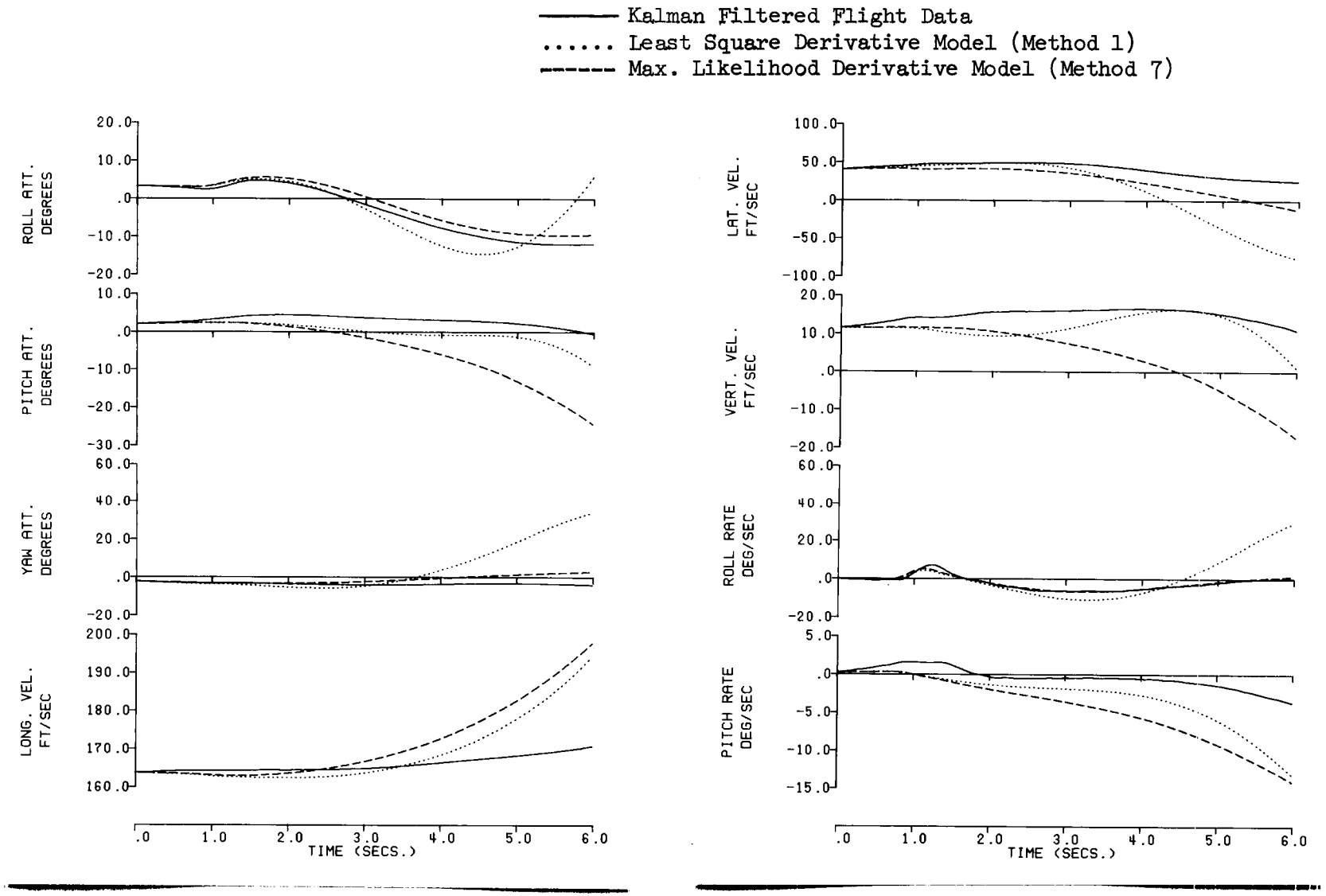
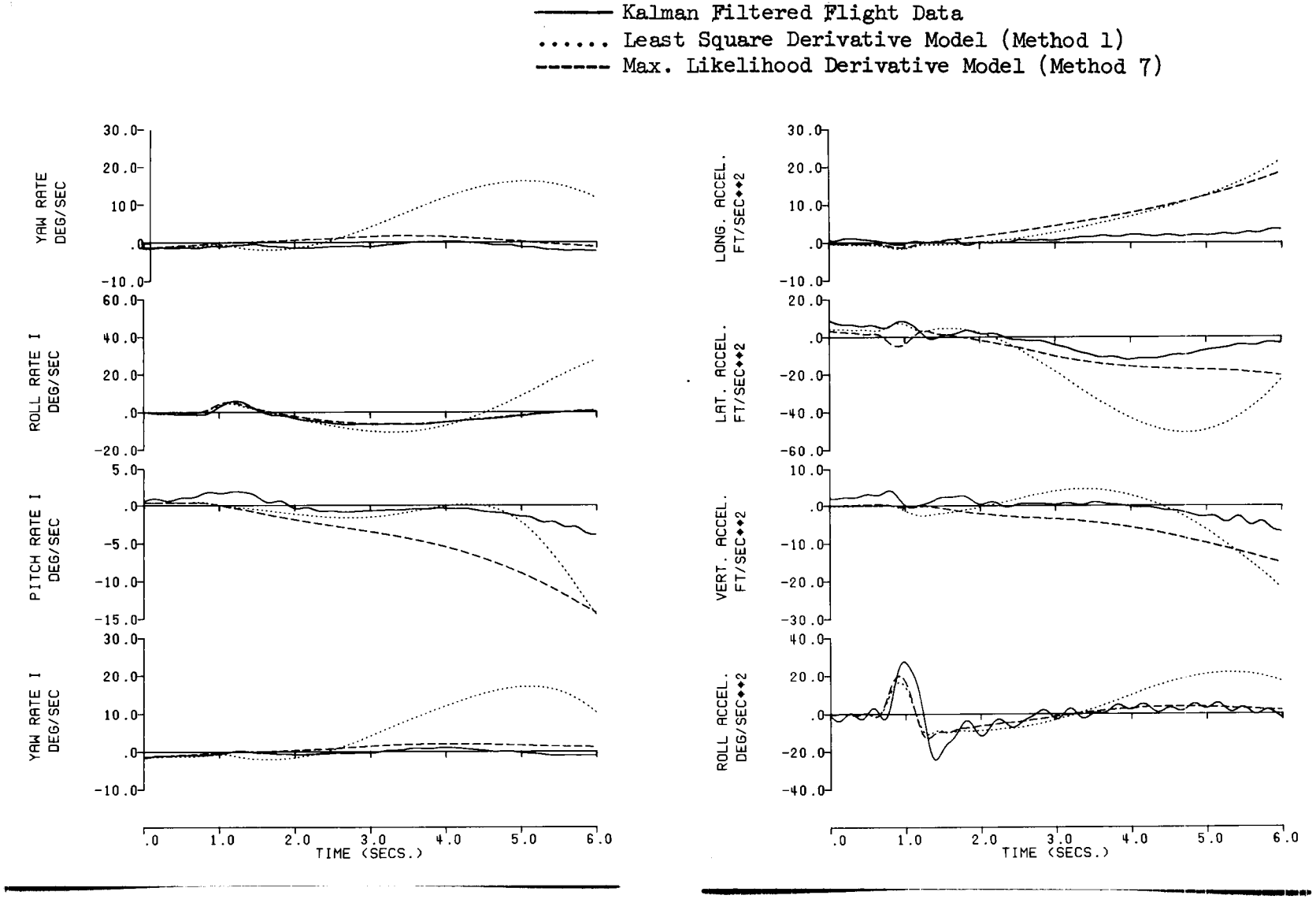


Figure 28. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 5).



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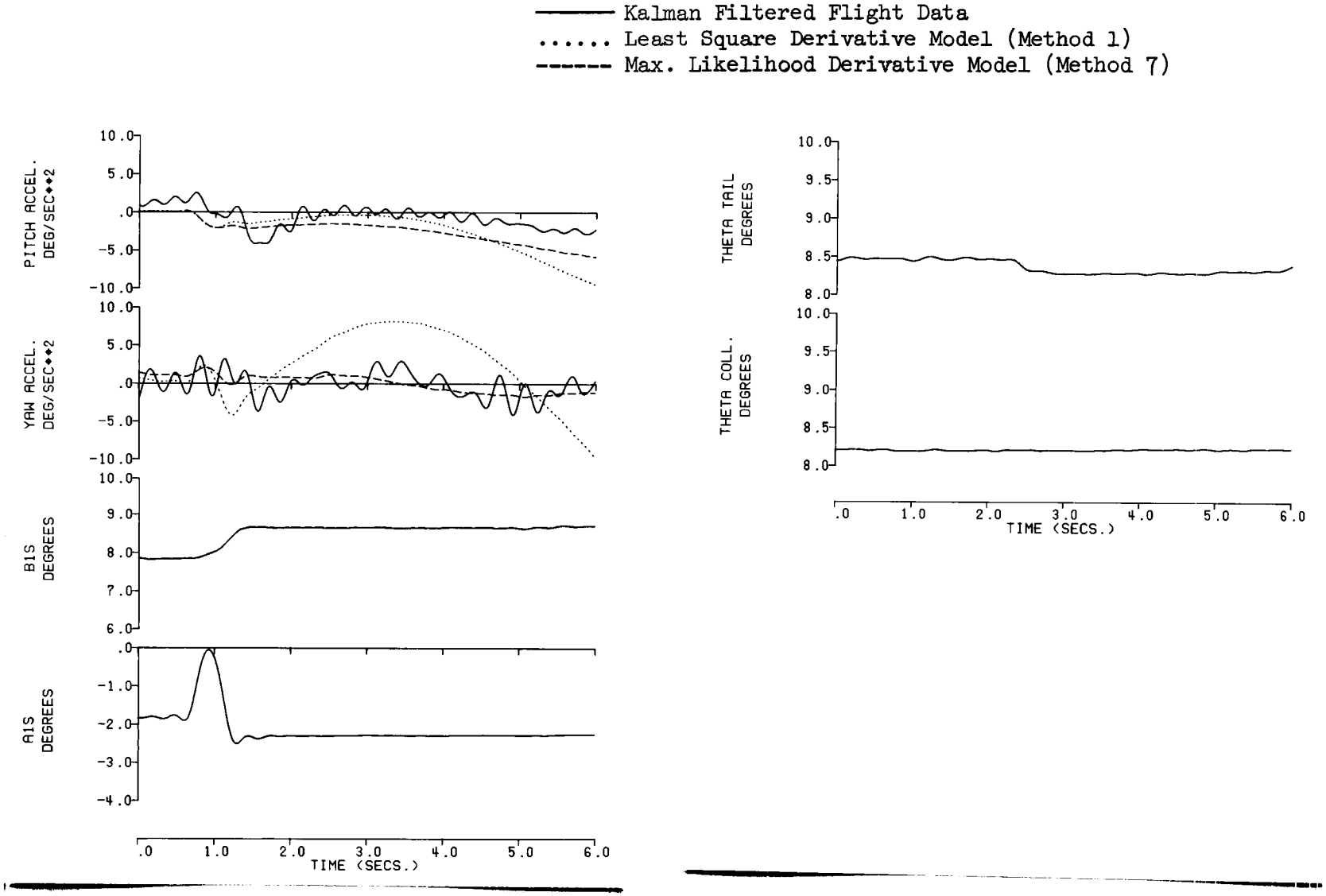

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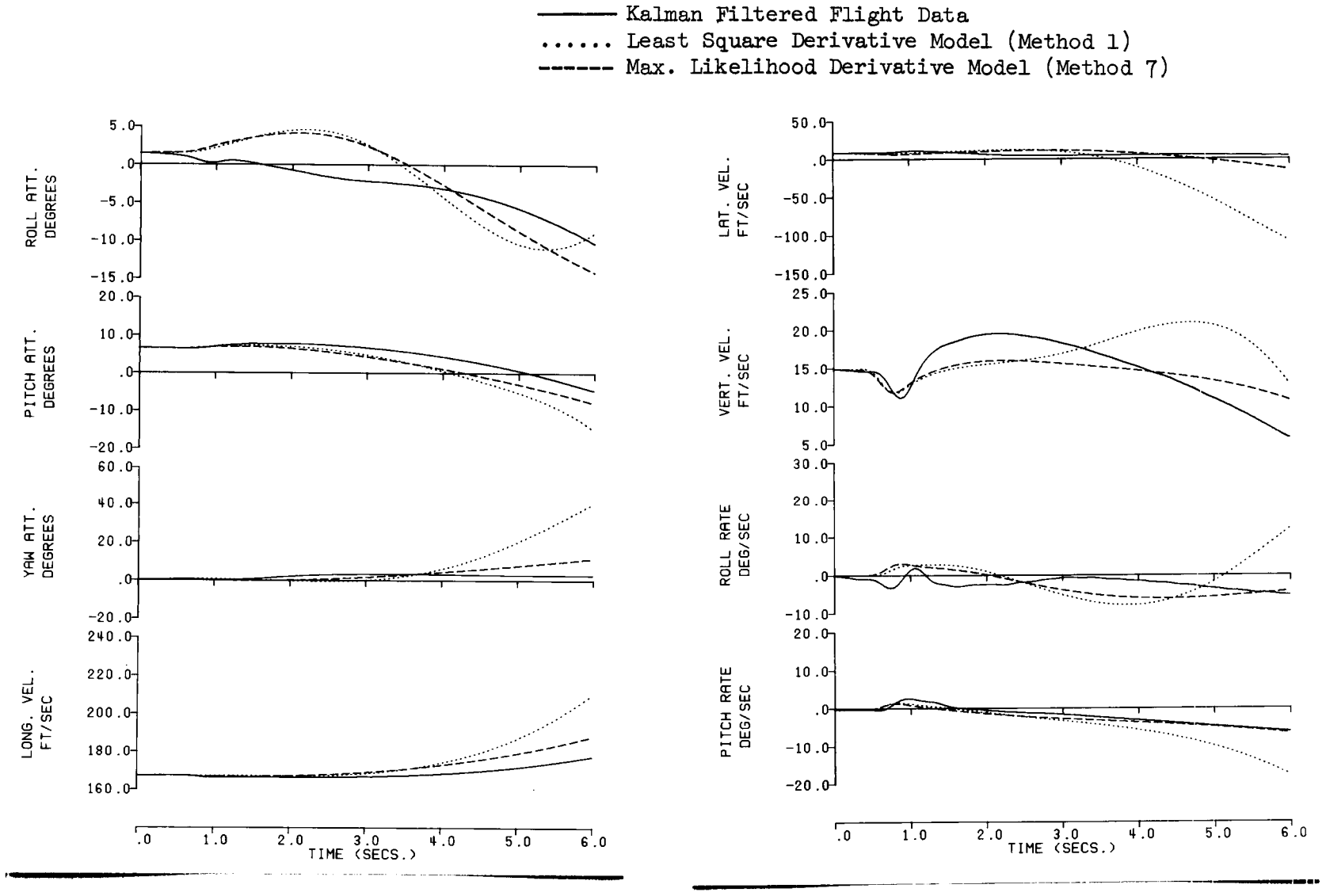
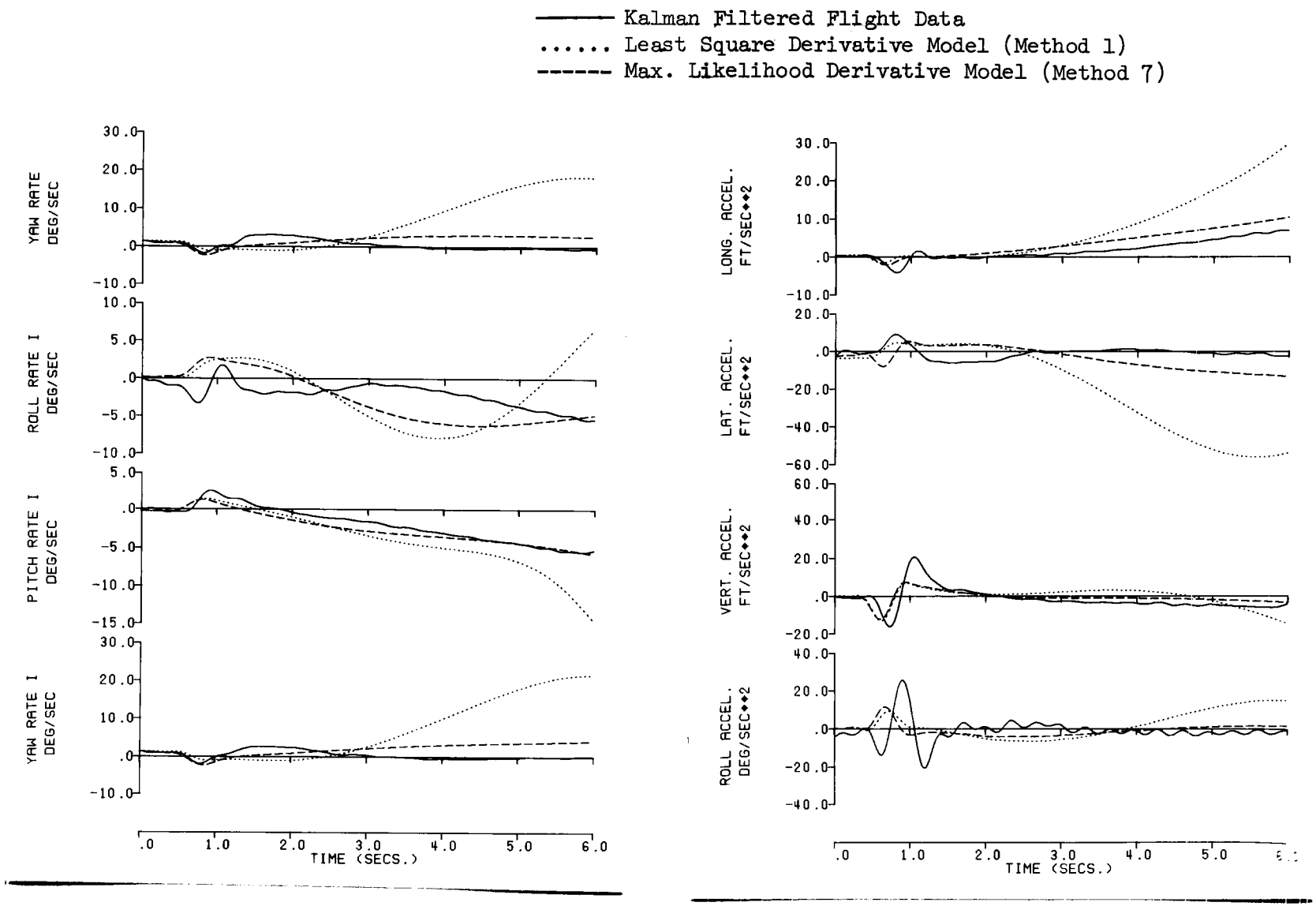


Figure 29. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 6).



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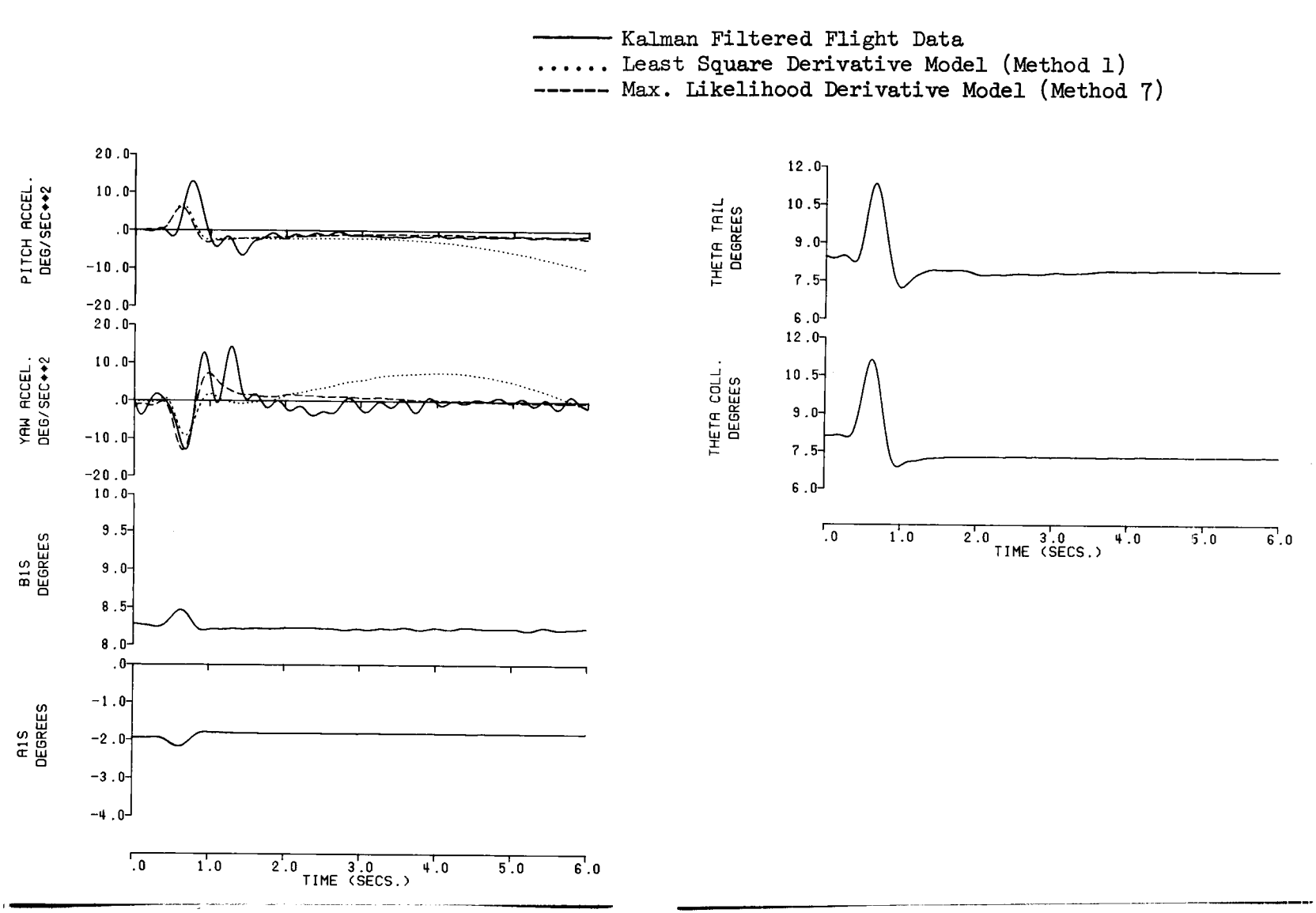

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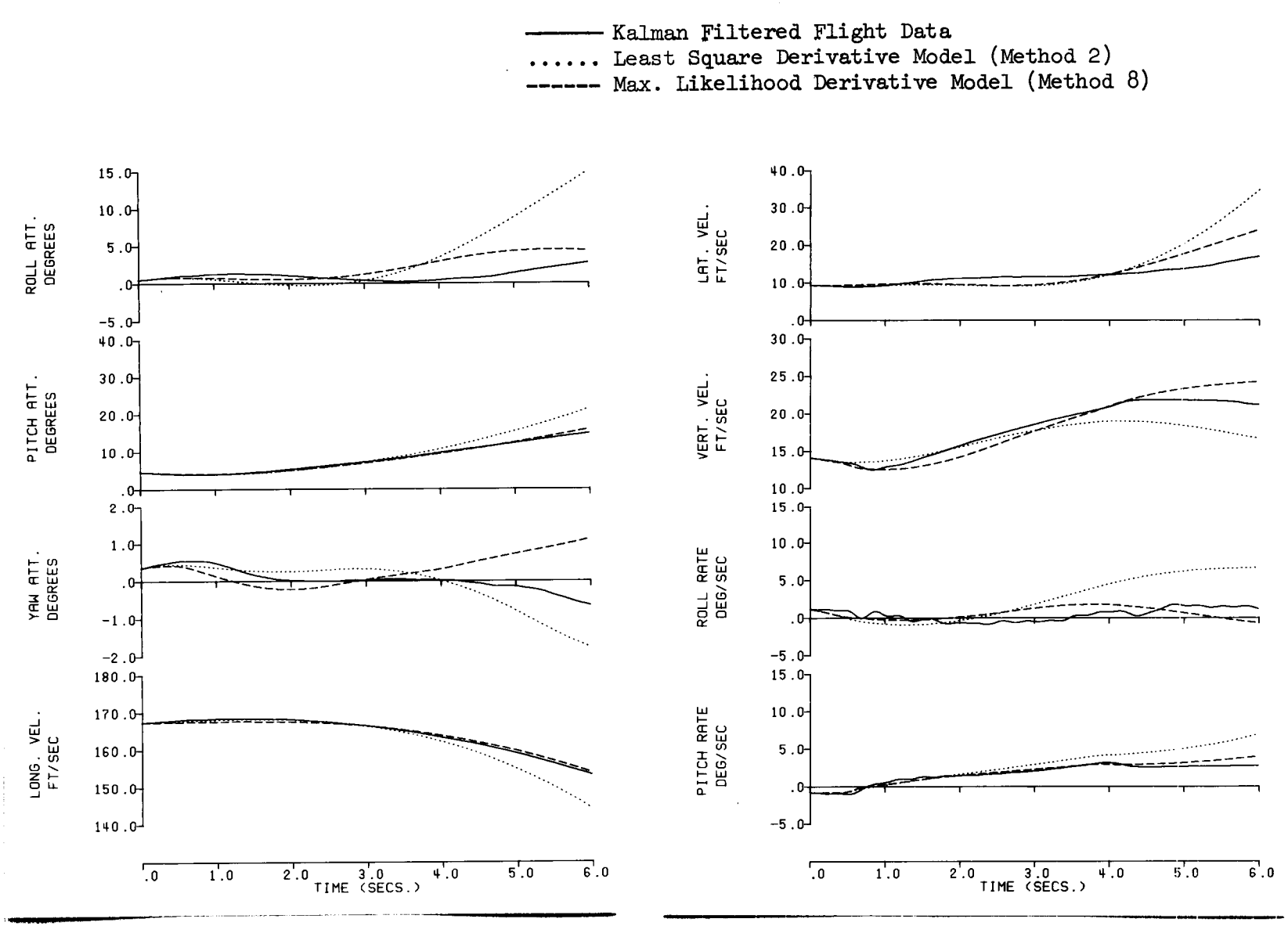
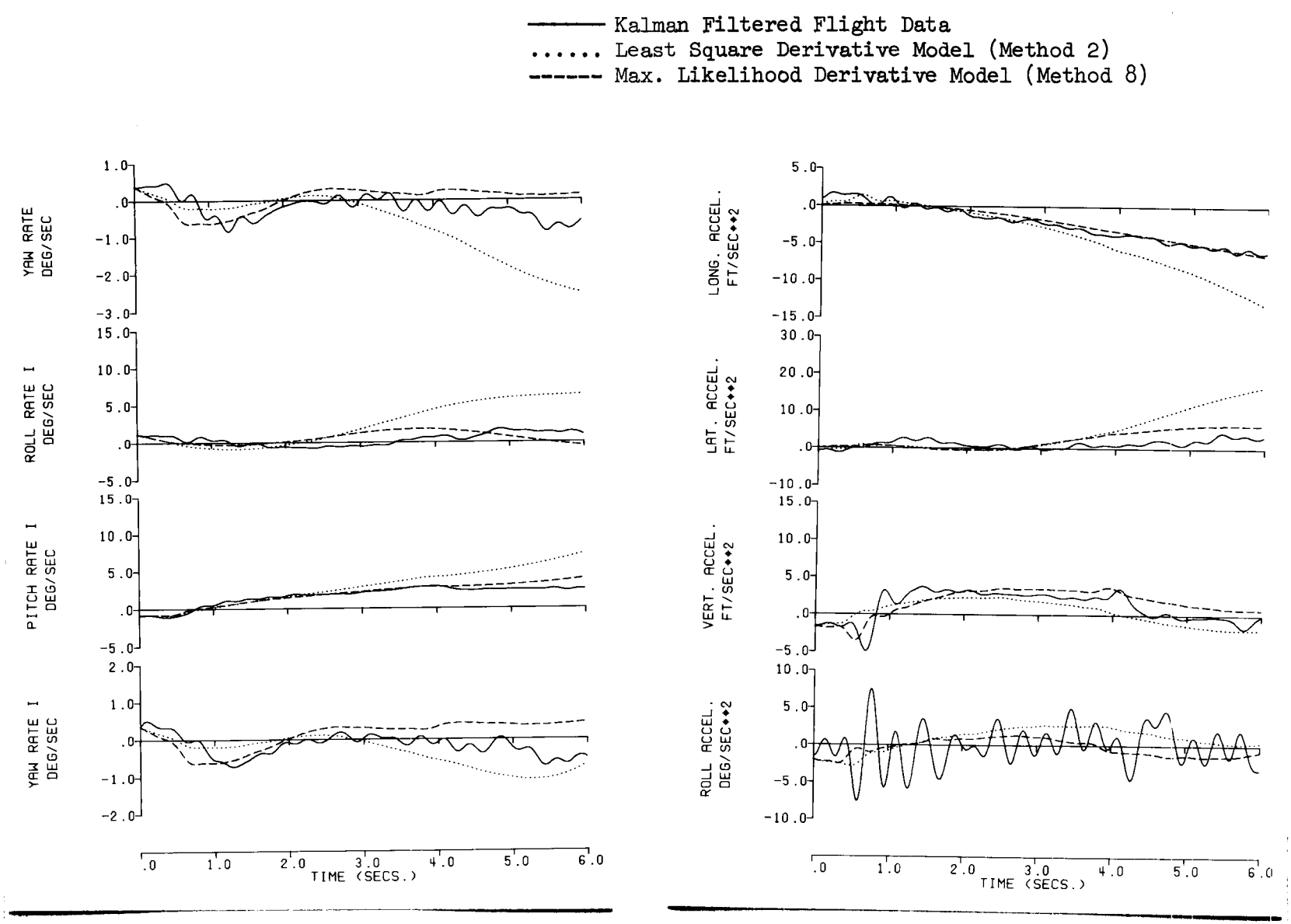


Figure 30. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 1).



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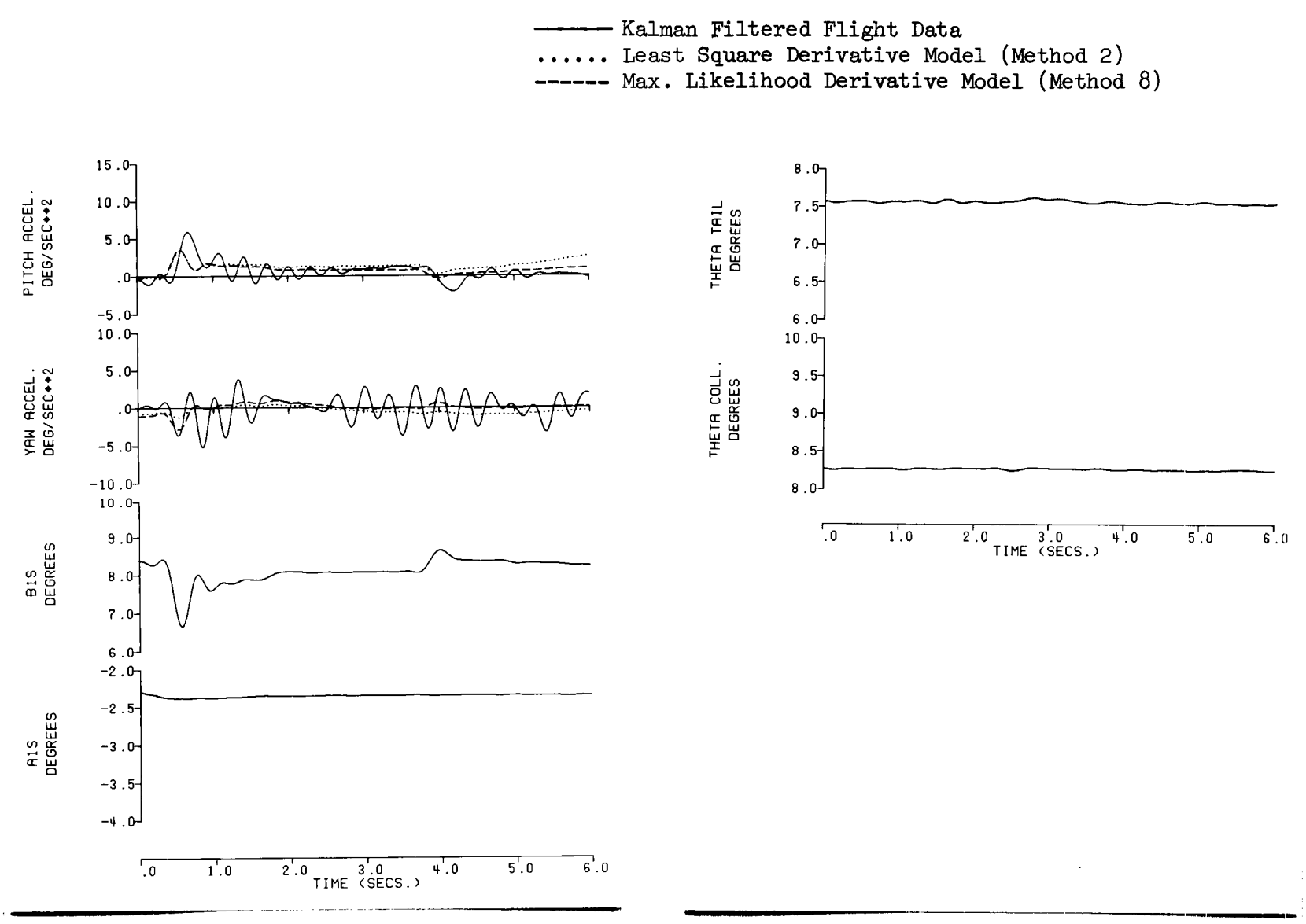

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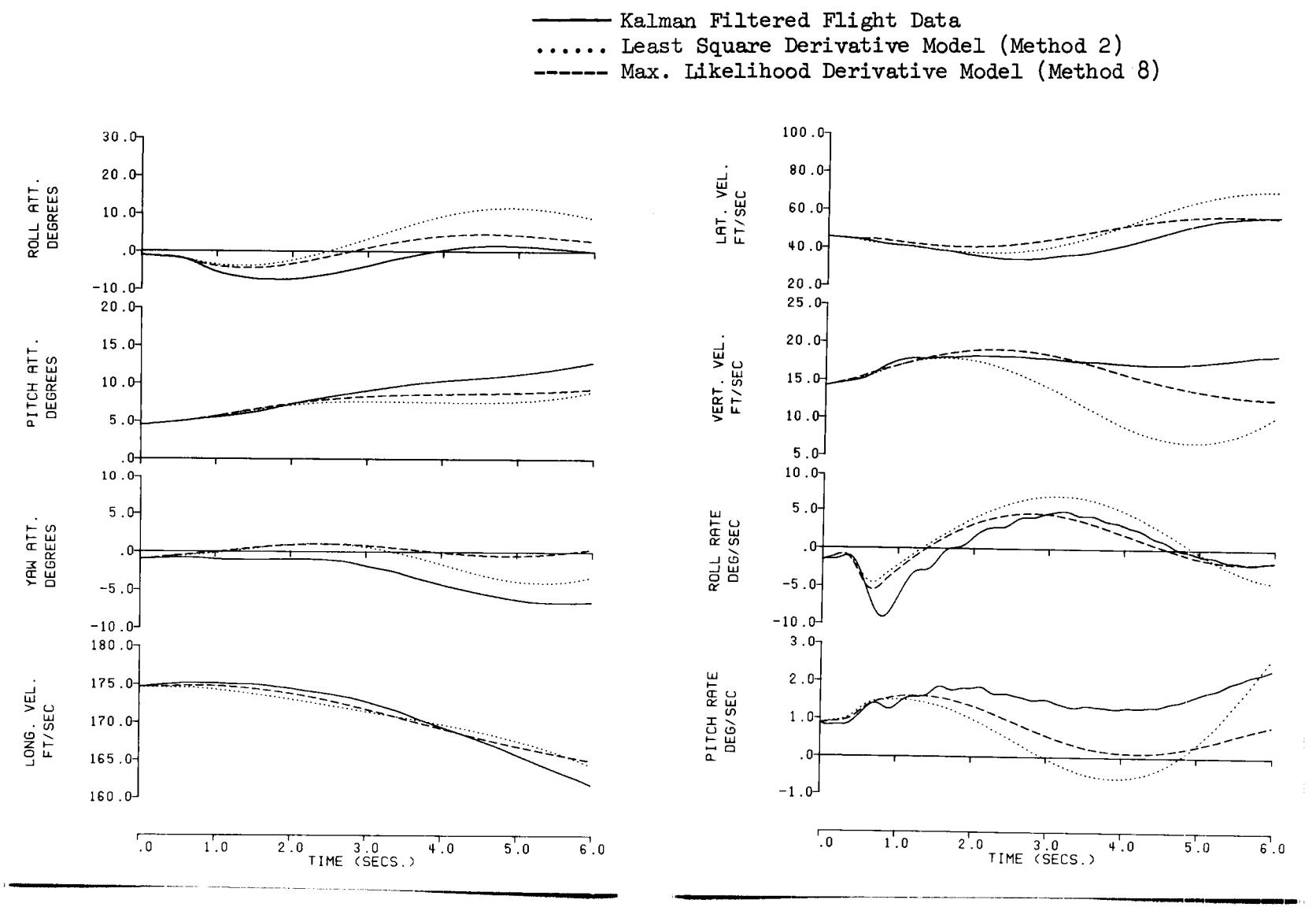
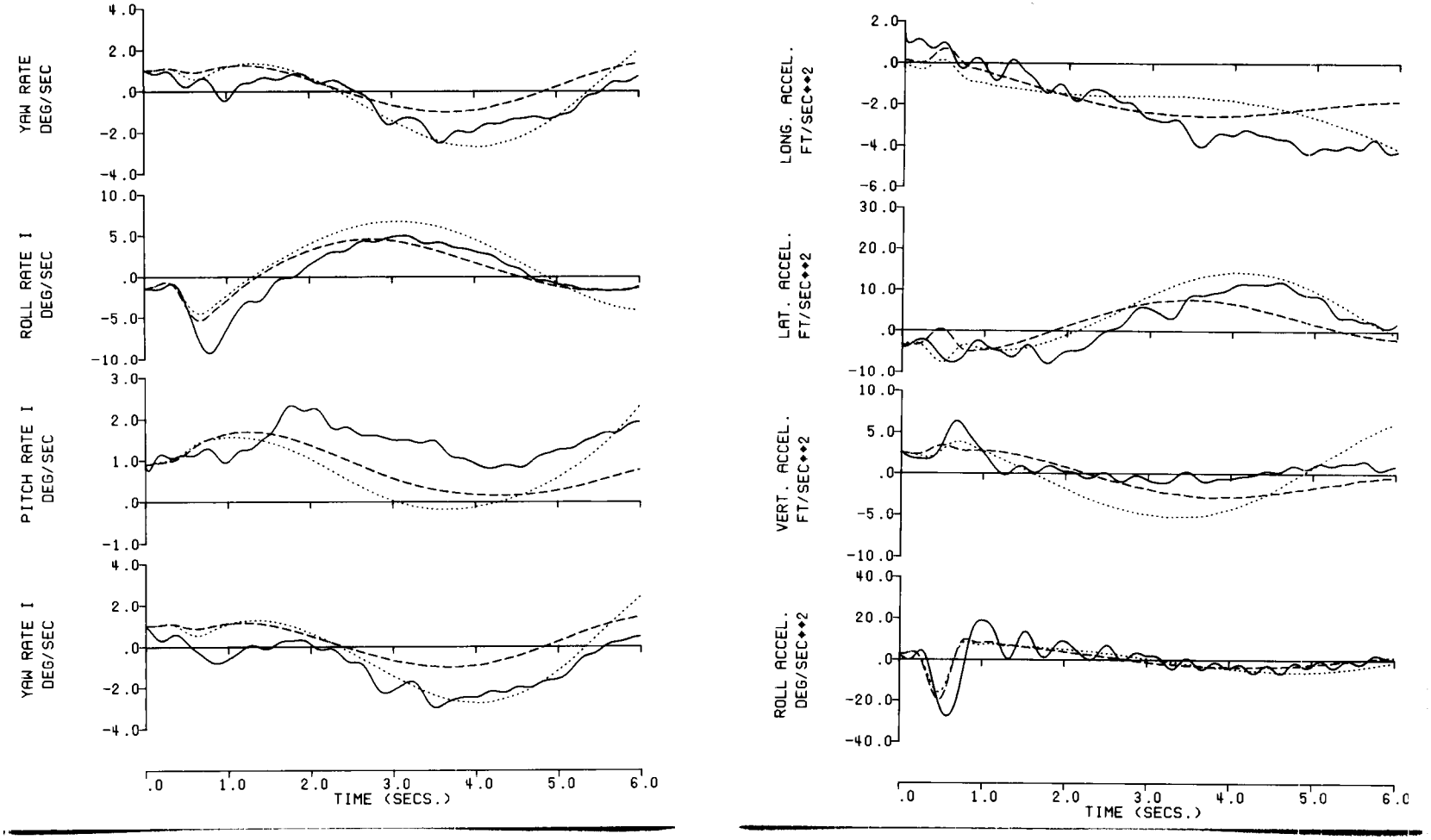


Figure 31. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 2).



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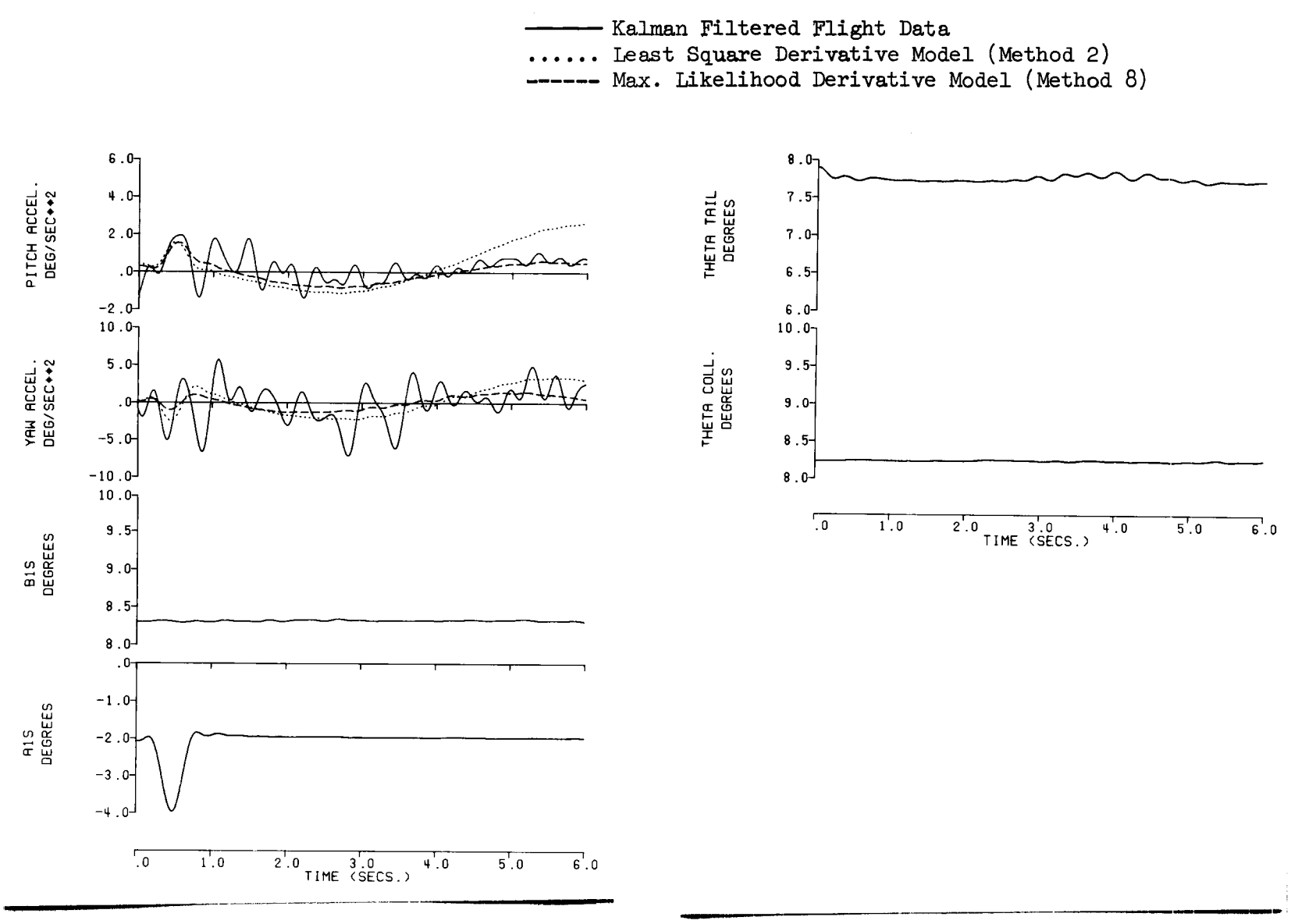

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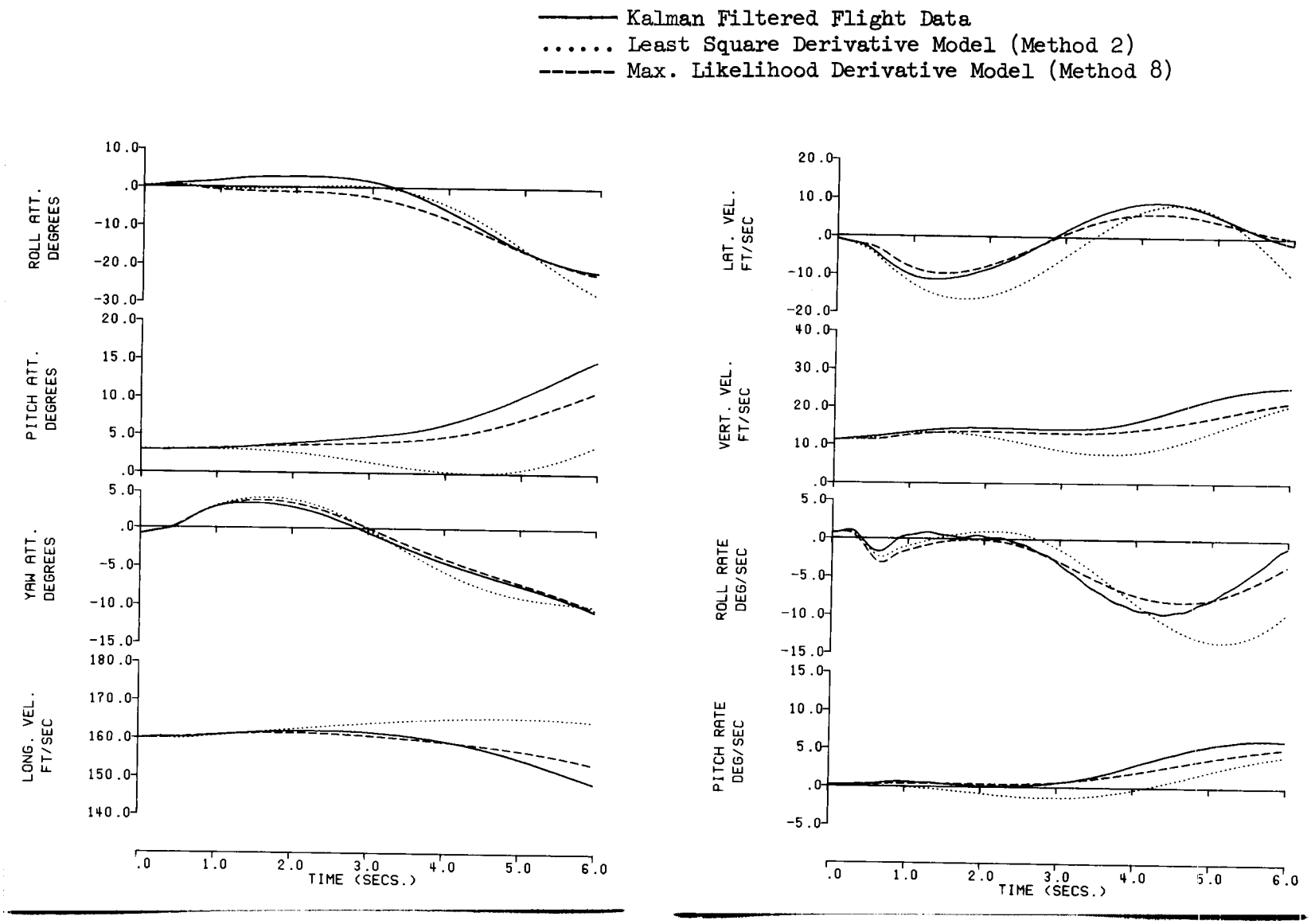
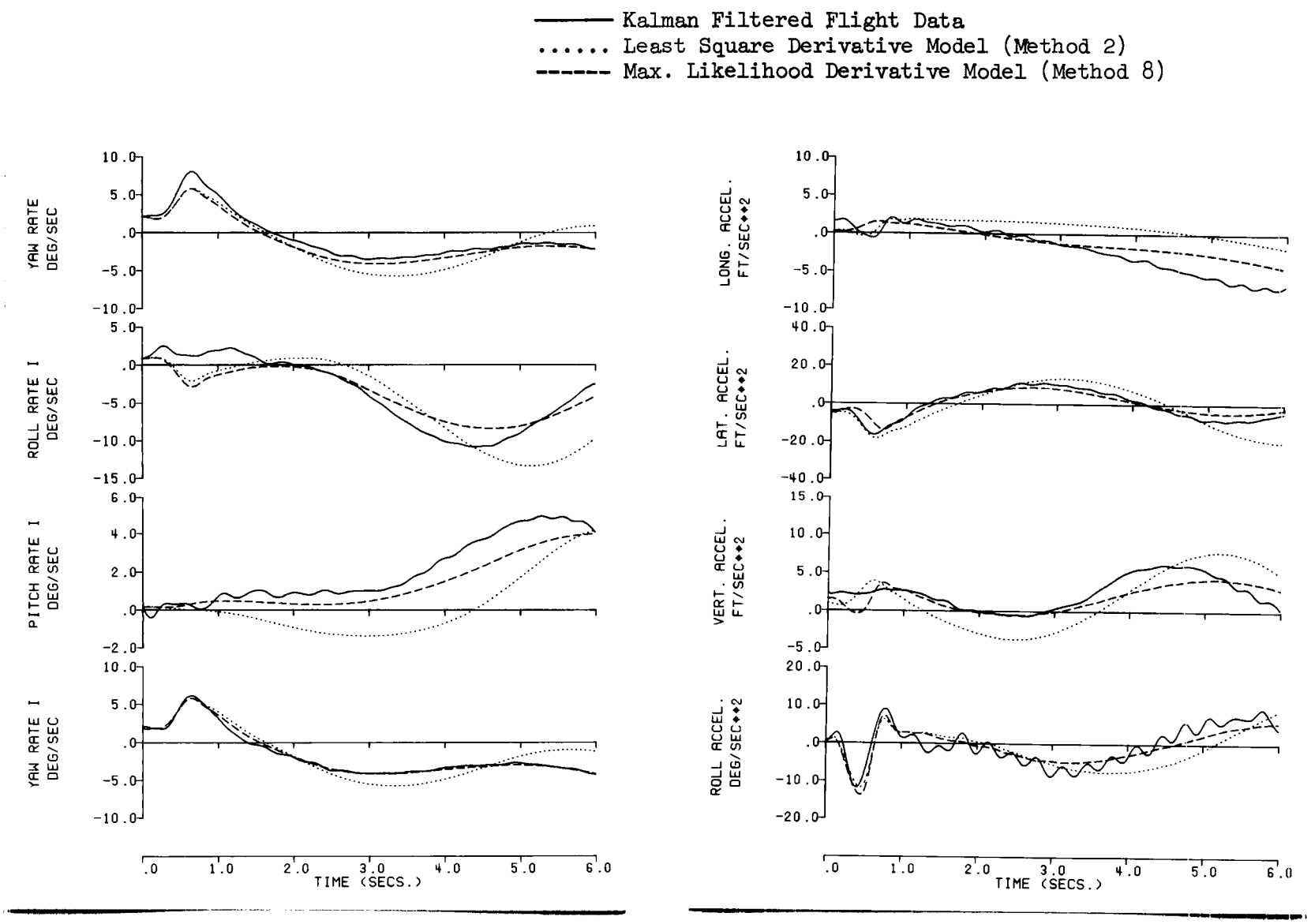


Figure 32. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 3).



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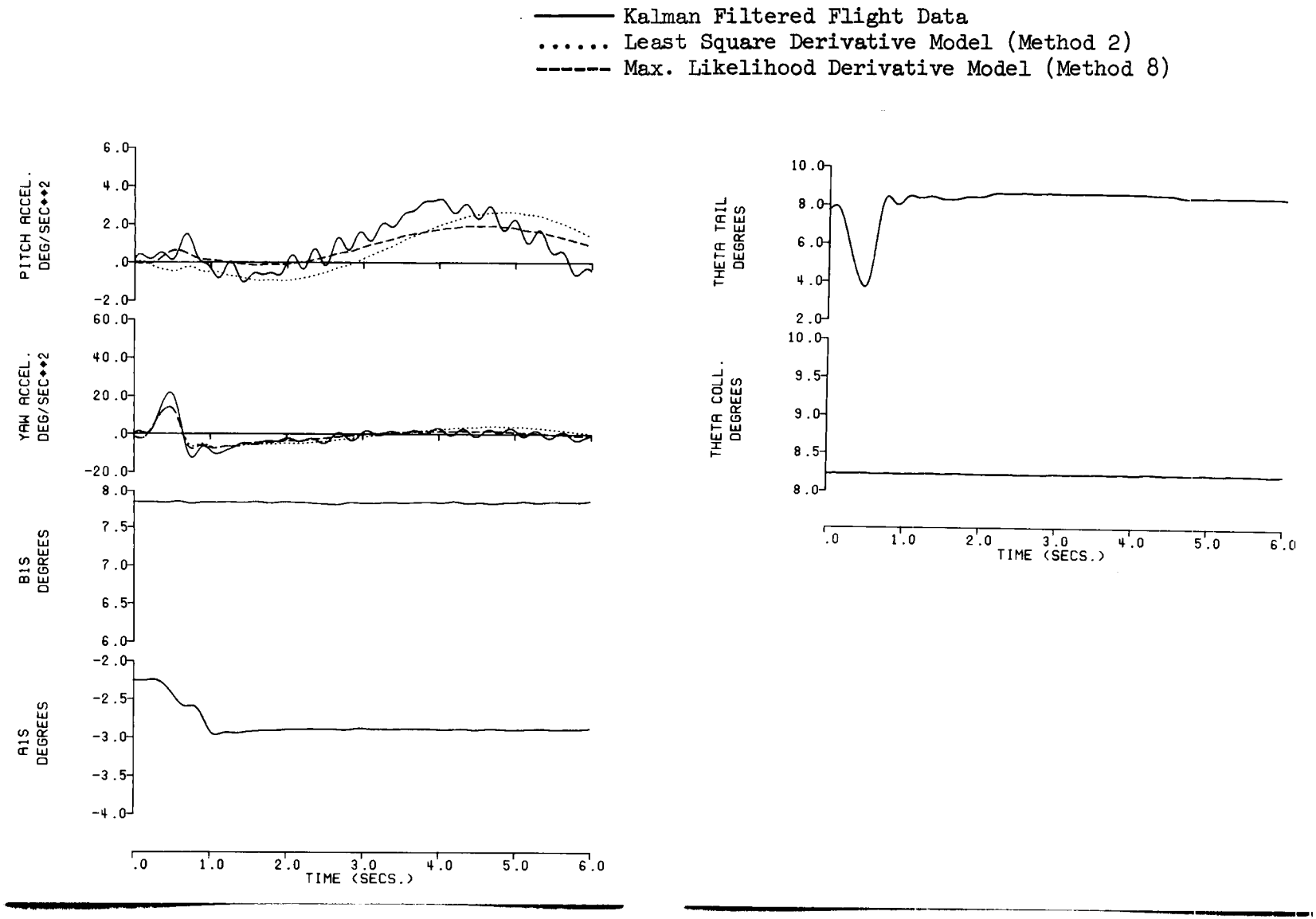

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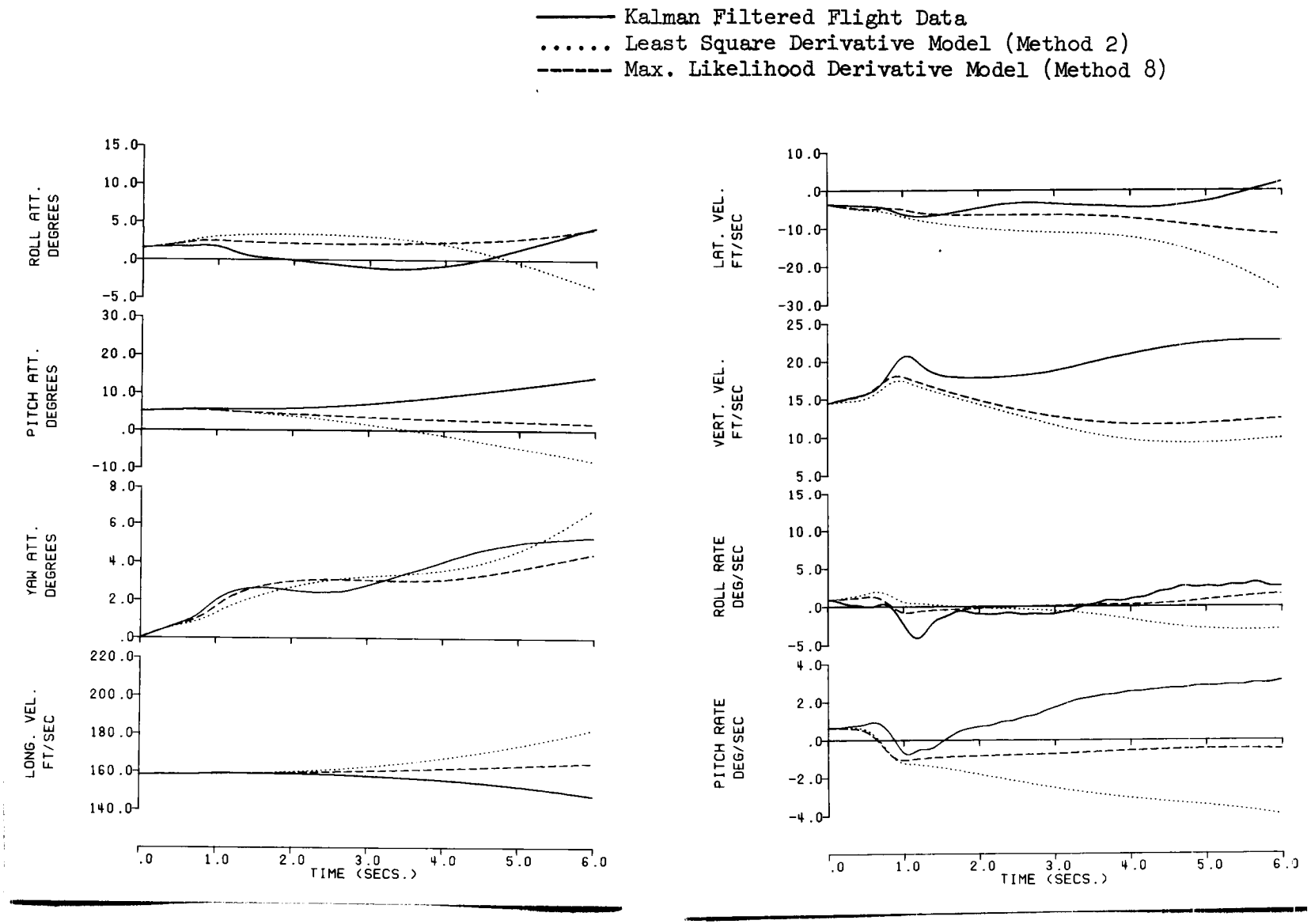
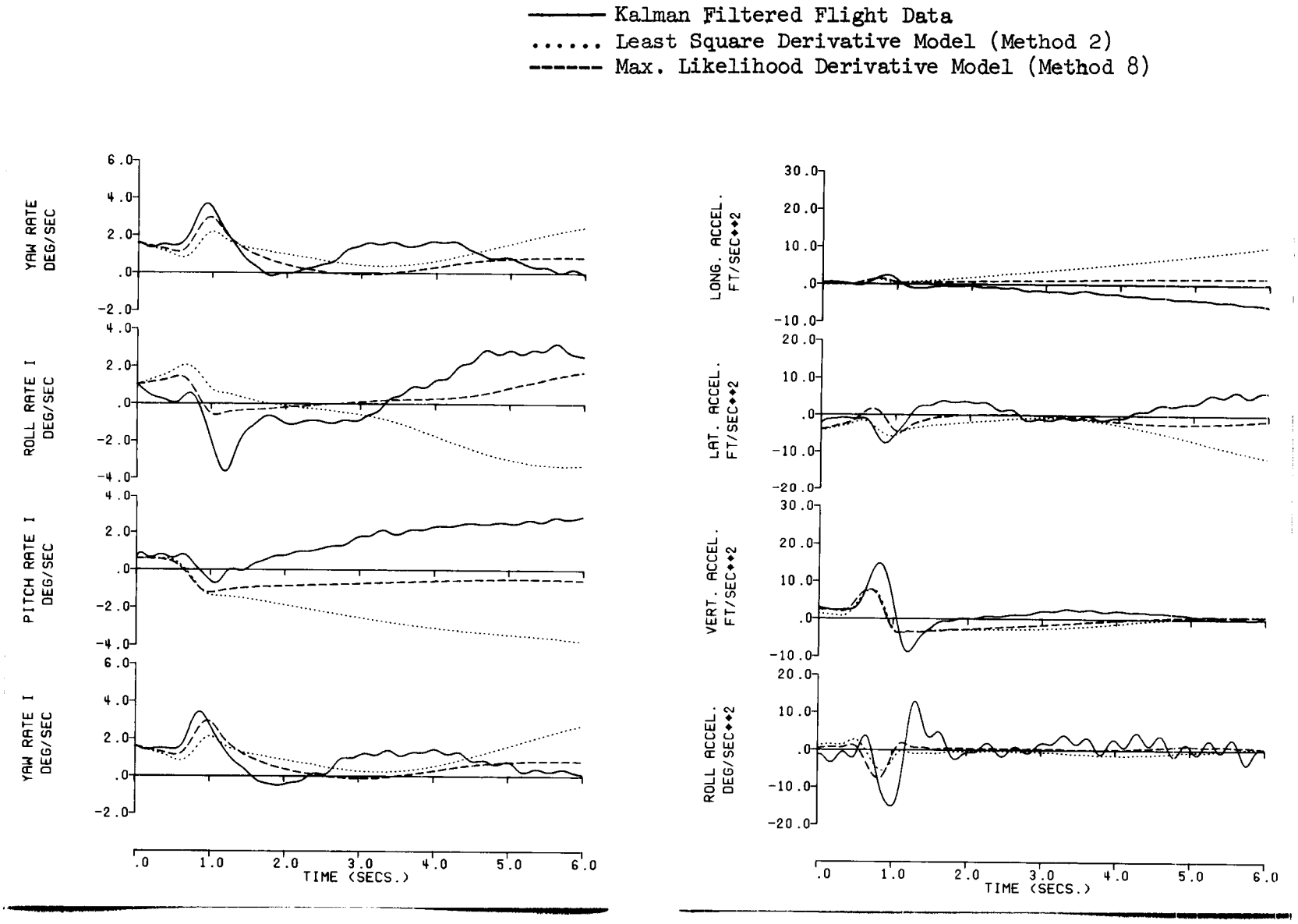


Figure 33. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 4).



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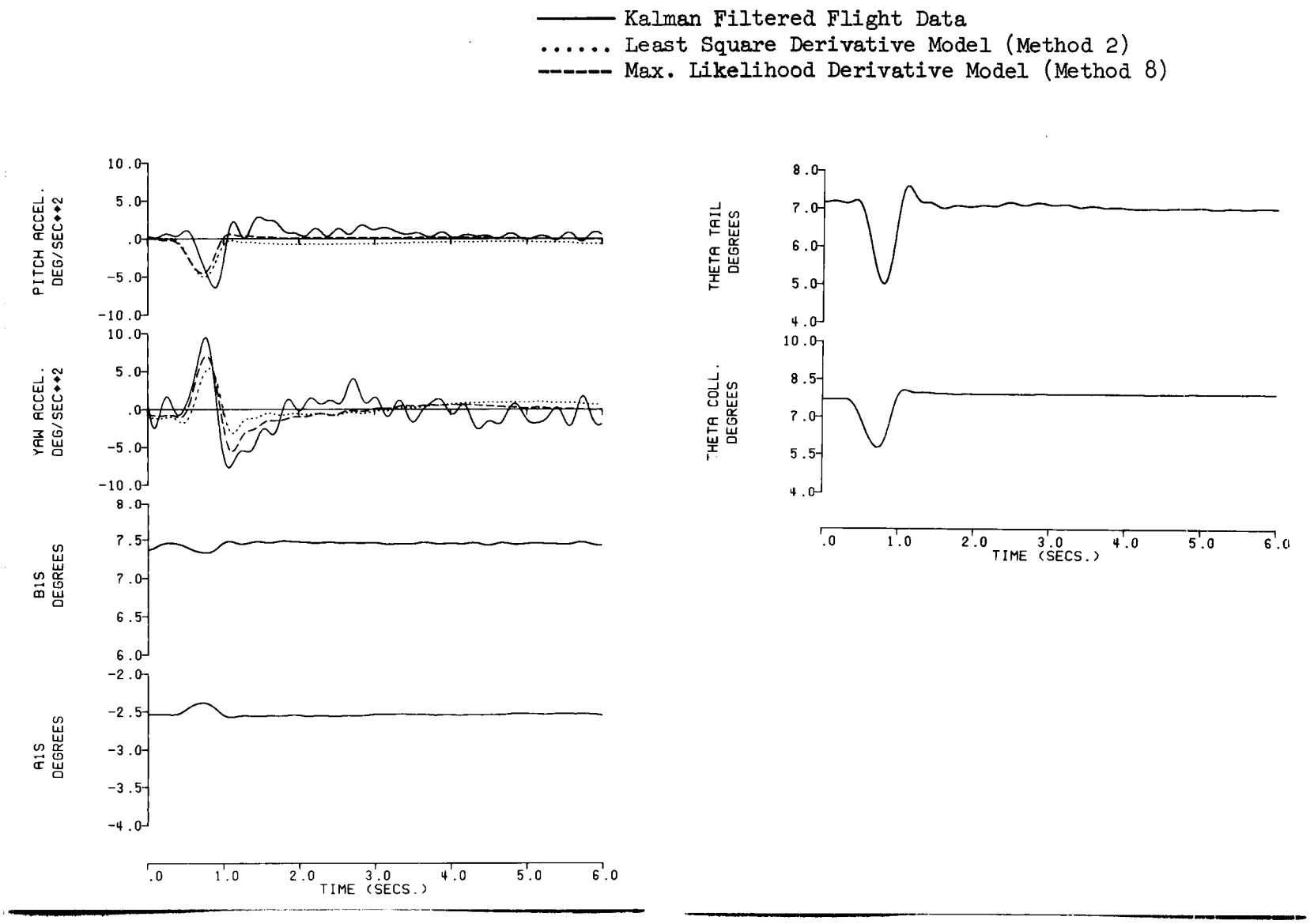

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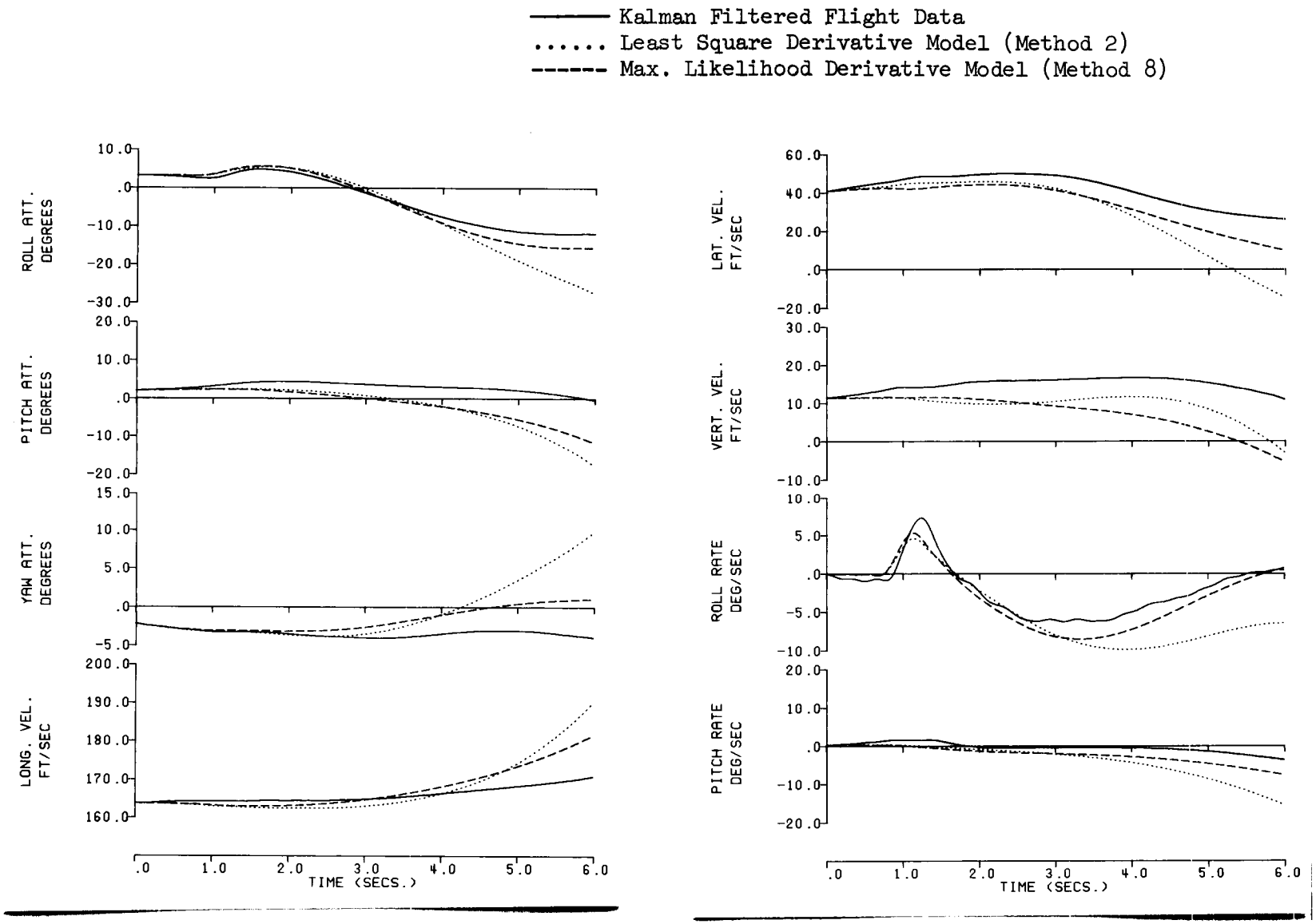
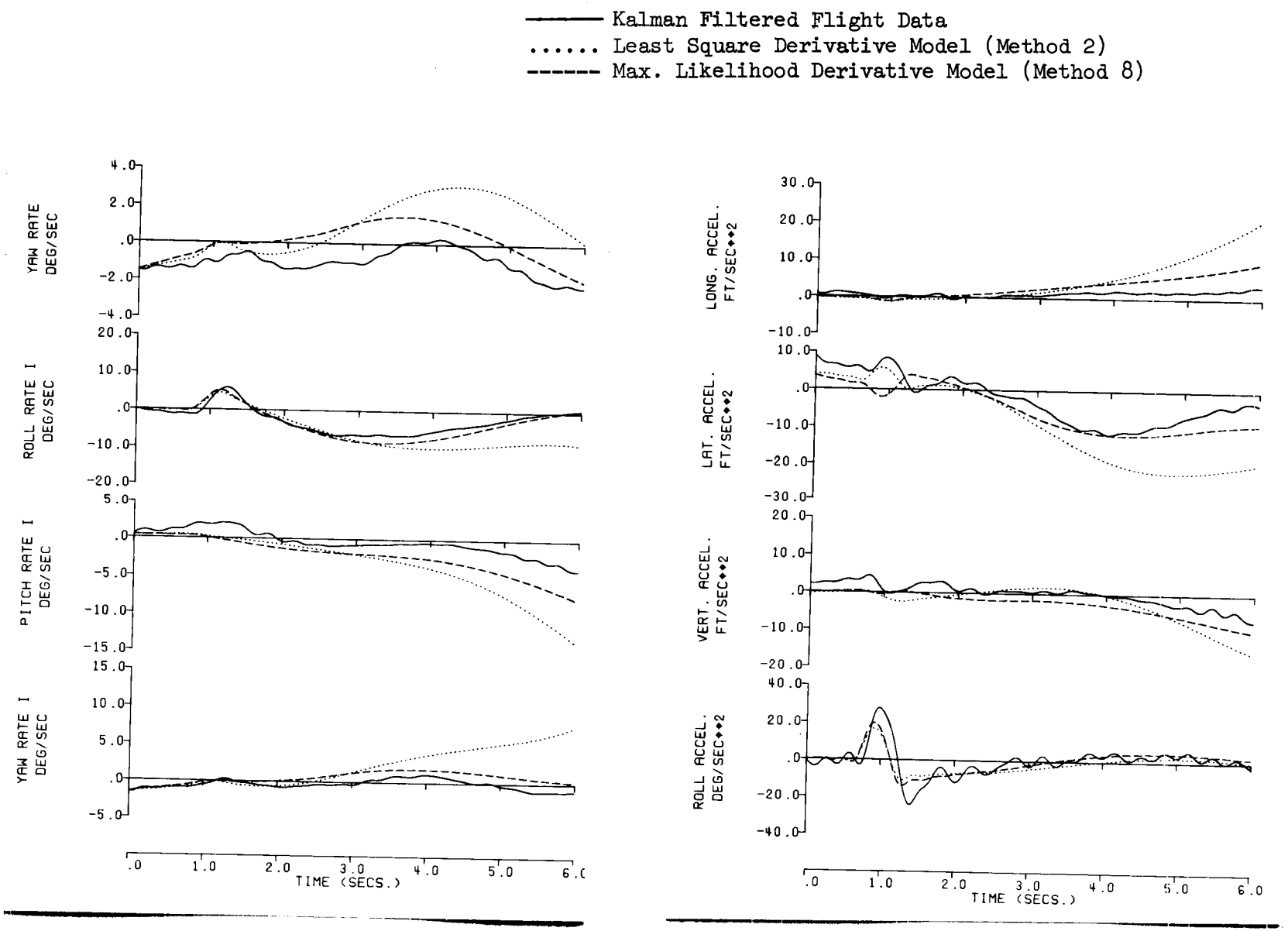


Figure 34. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 5).



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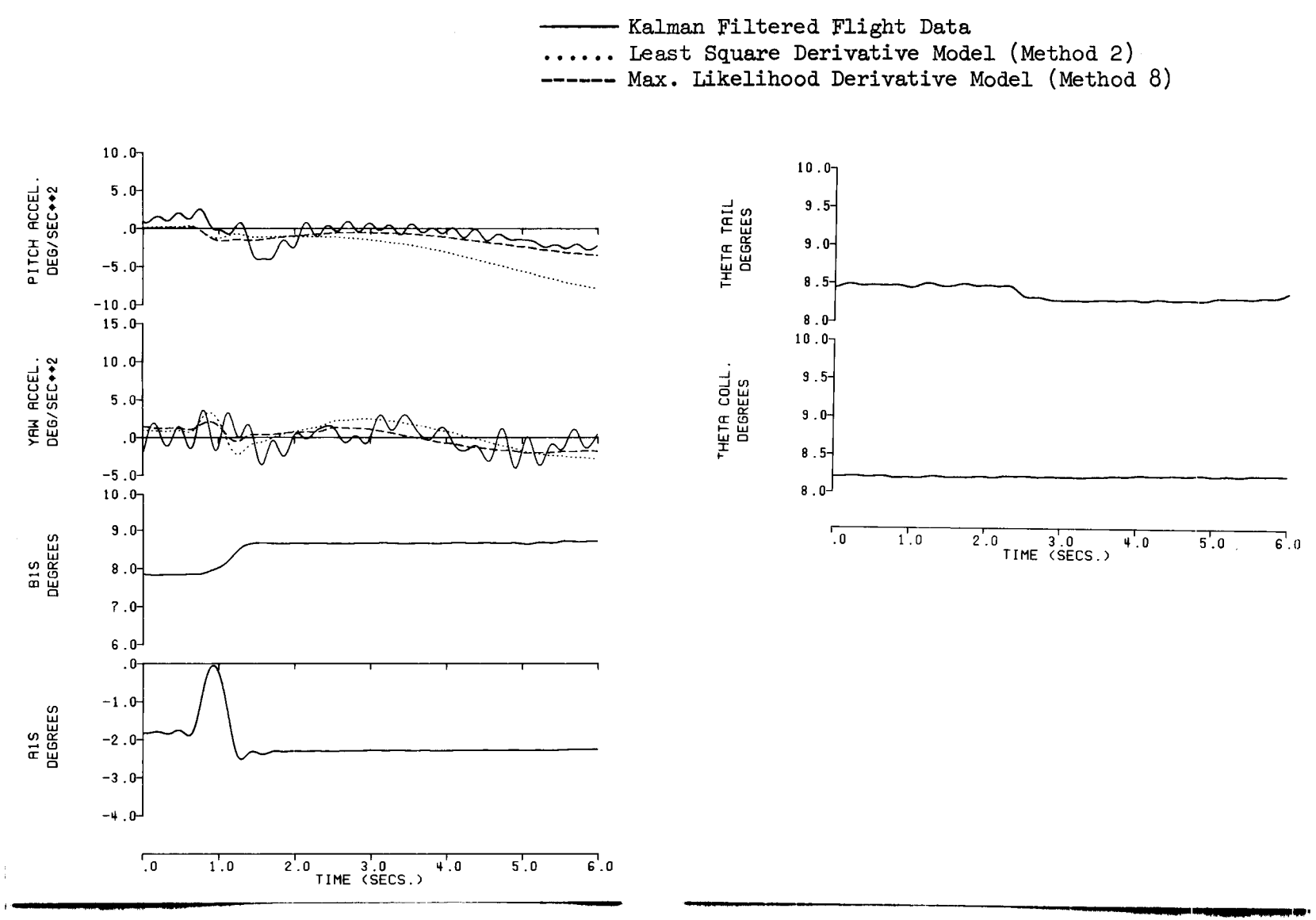

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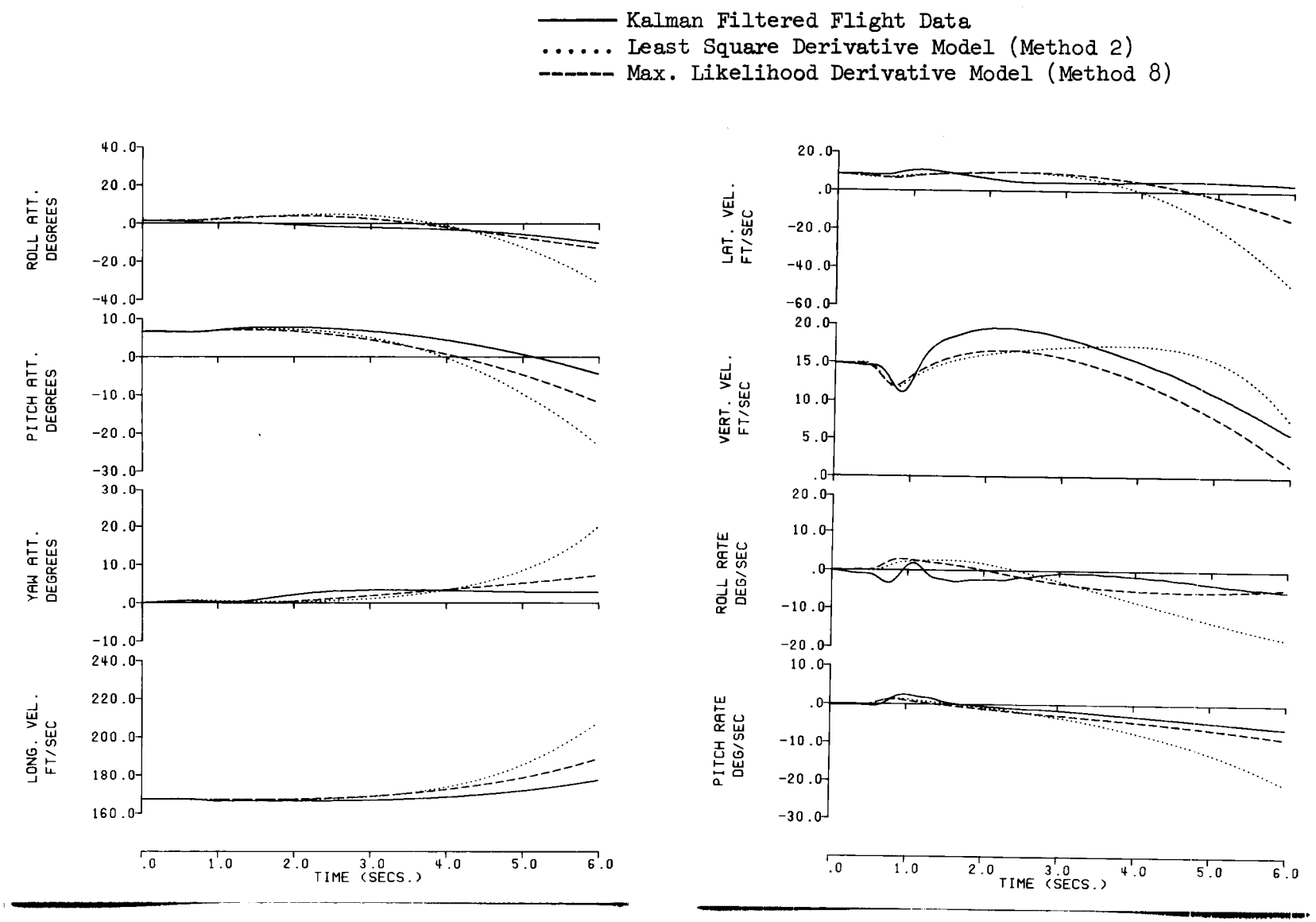


Figure 35. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 6).

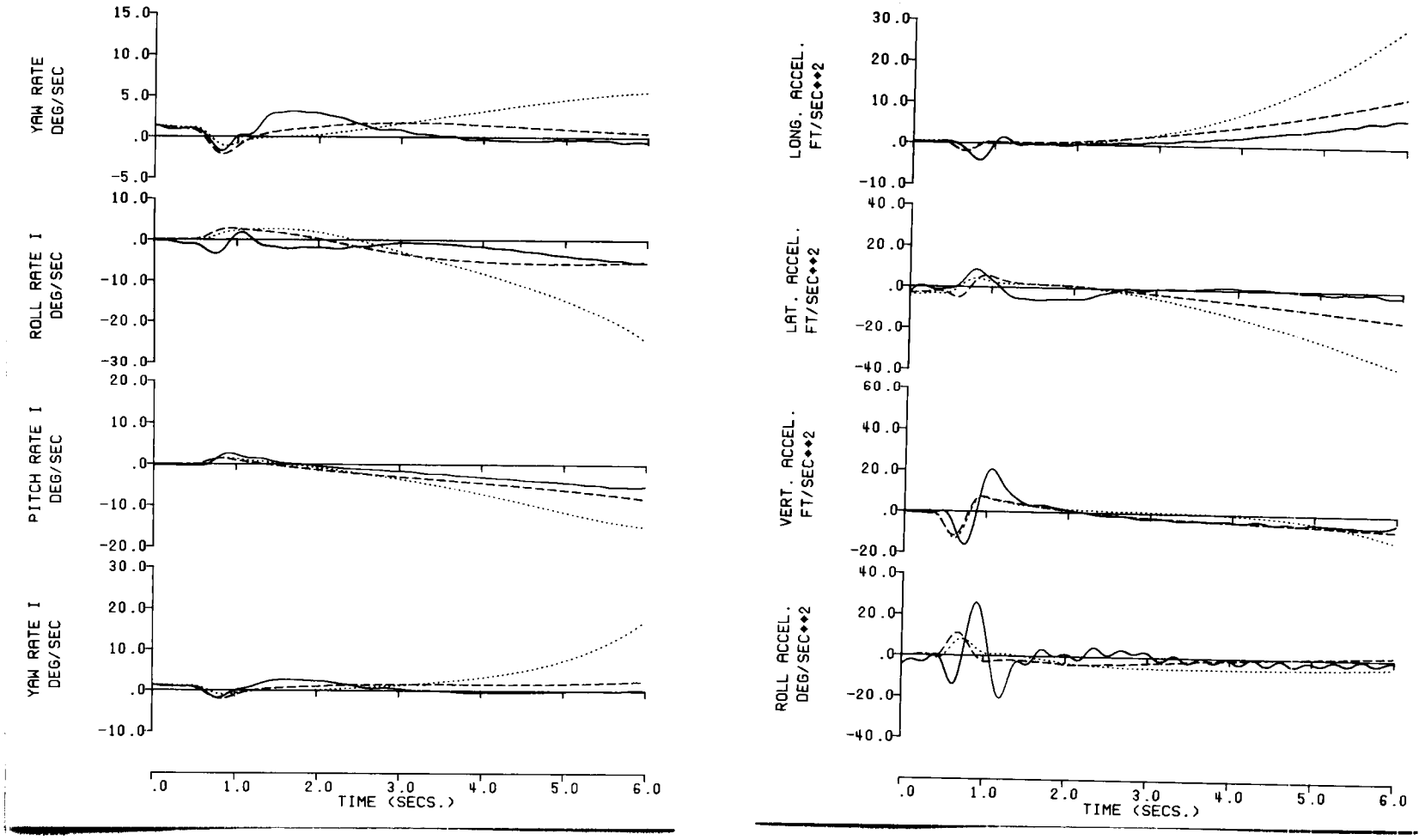
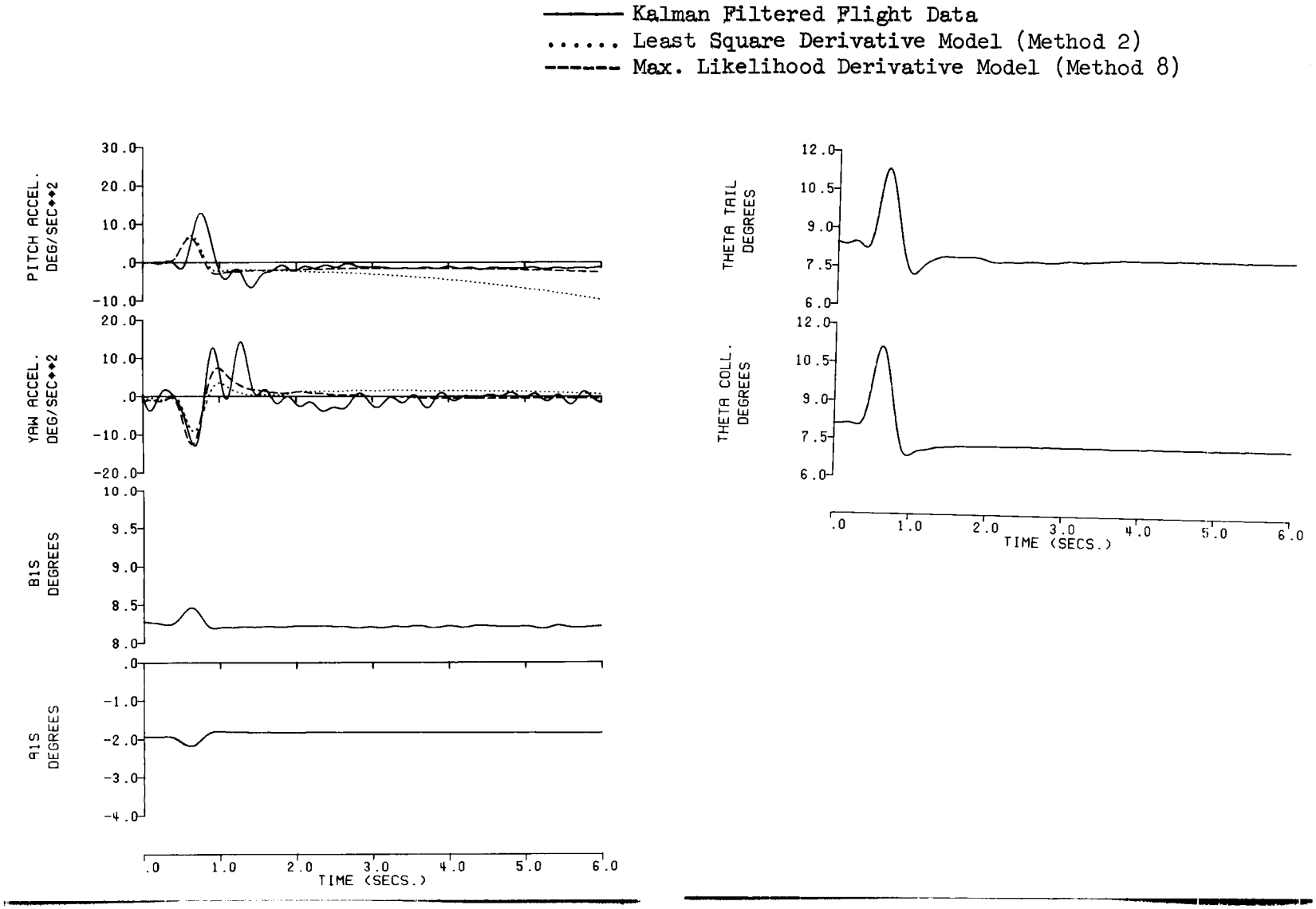


Figure 35. - Continued.



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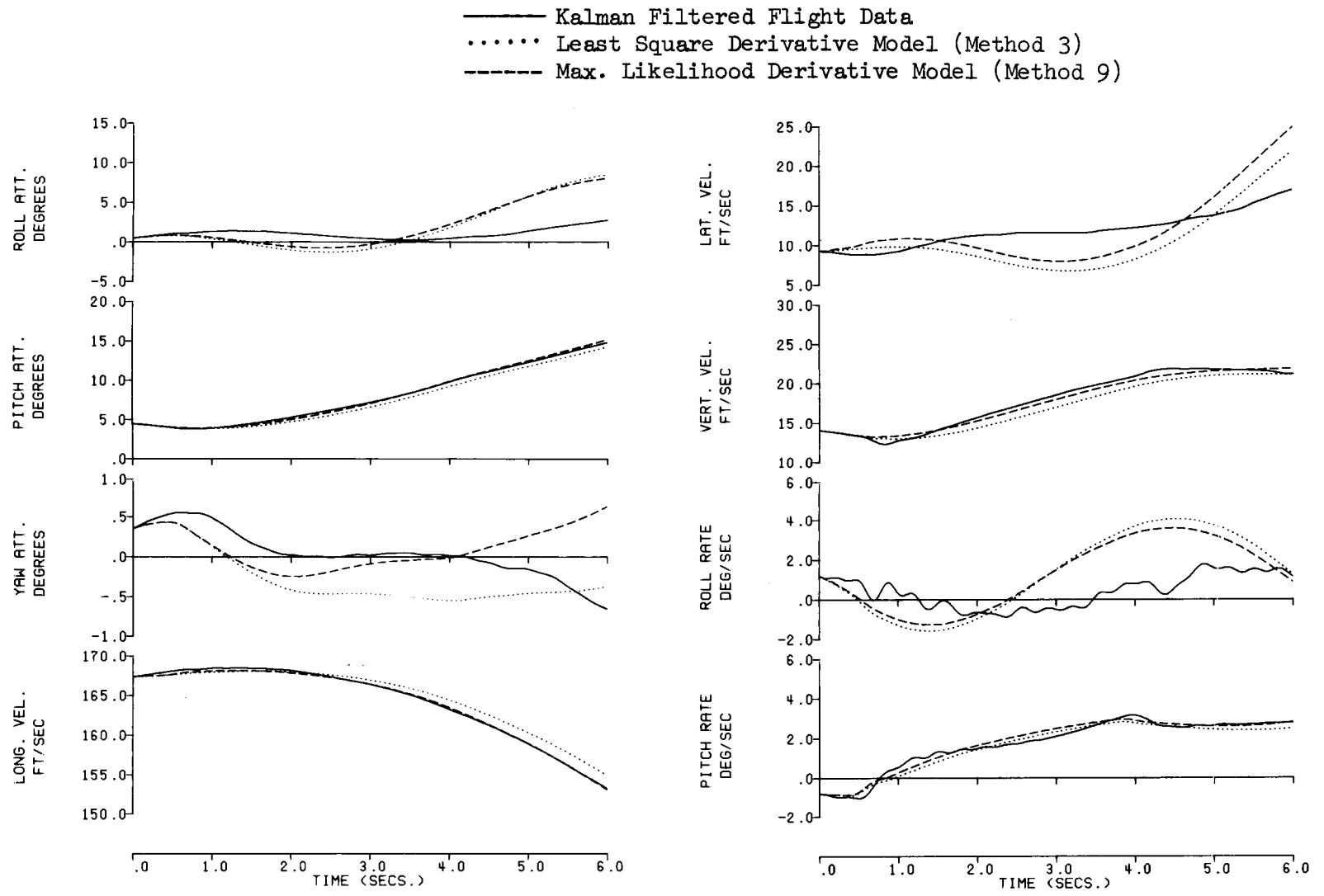
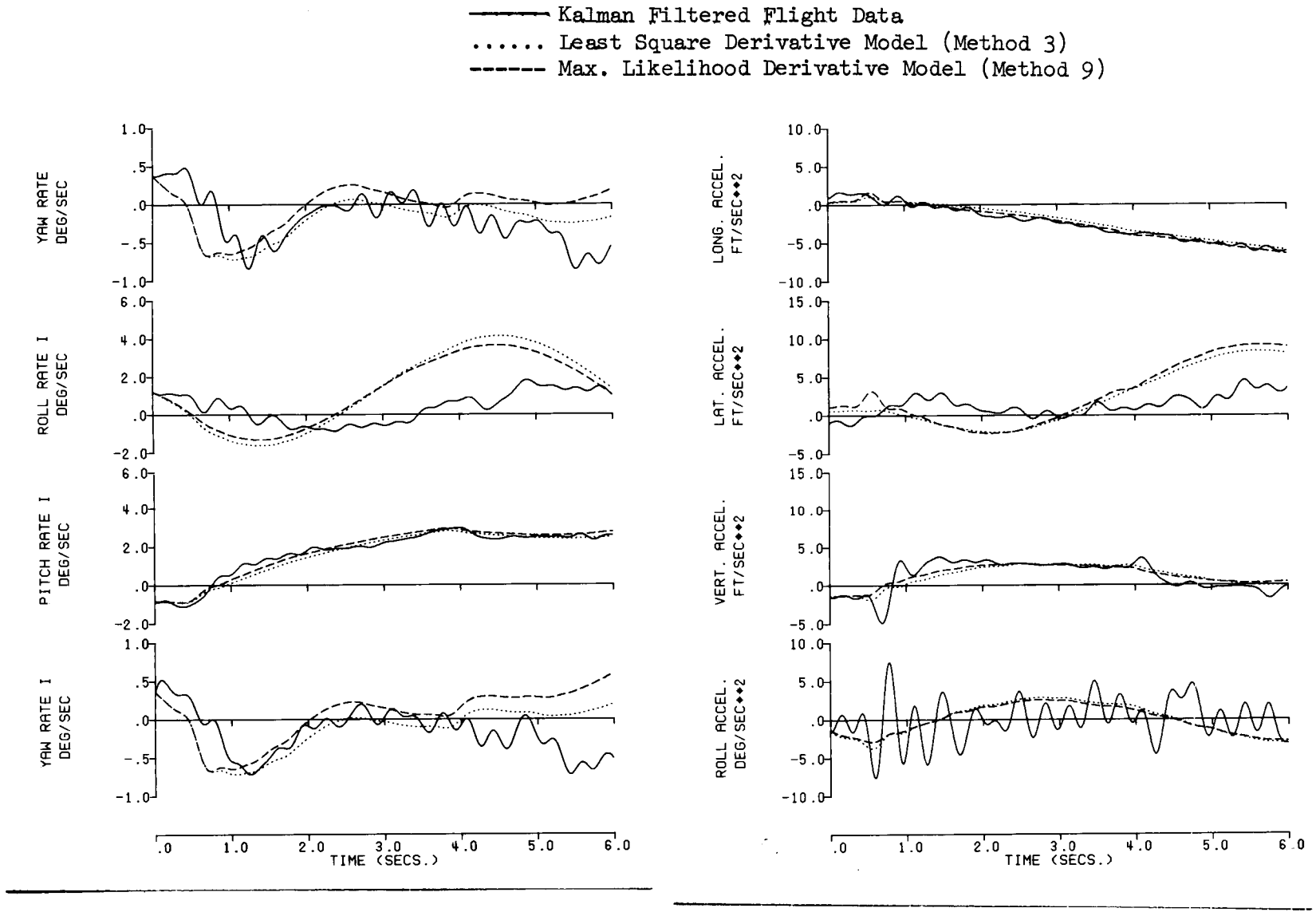


Figure 36 - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 1).



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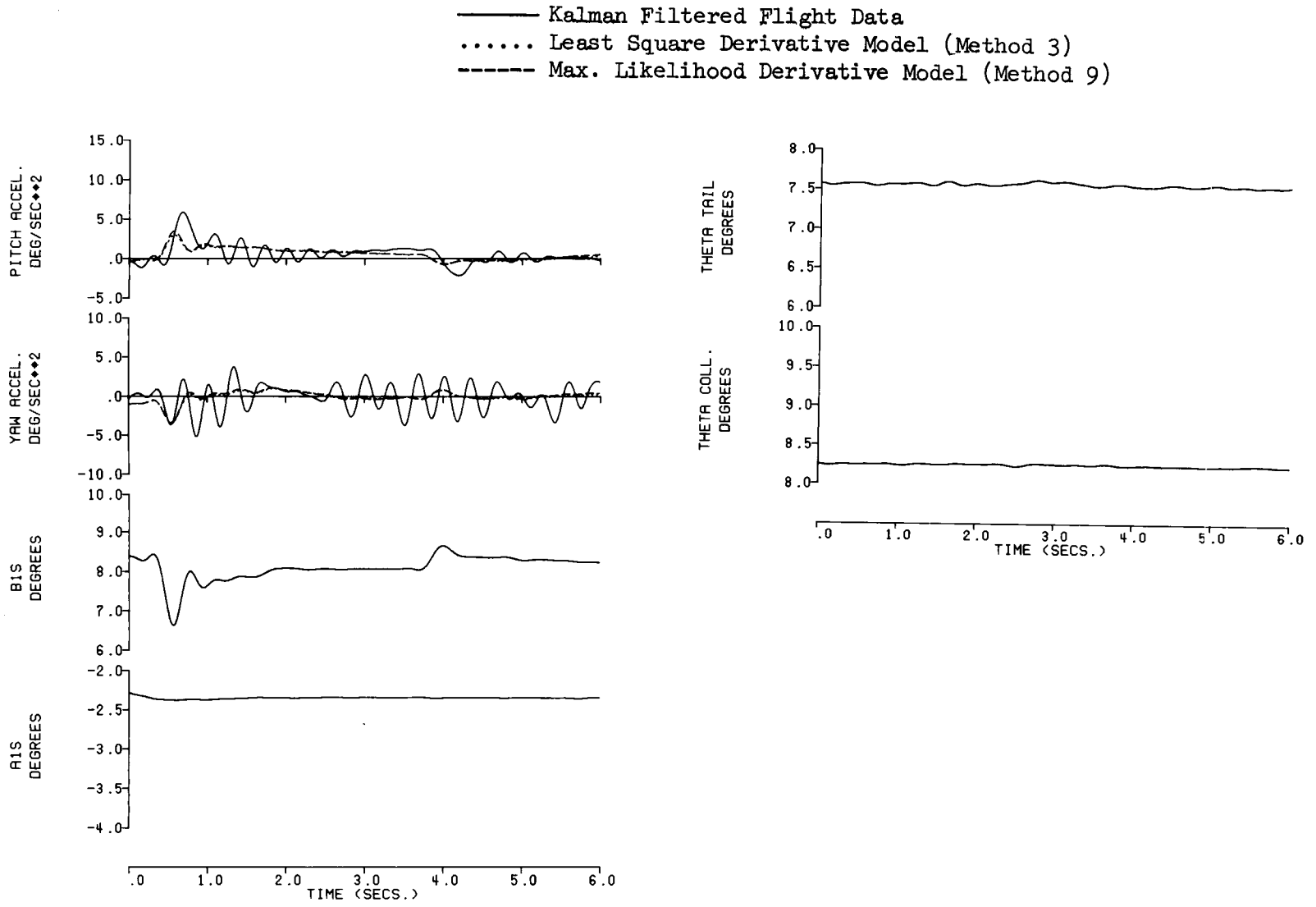

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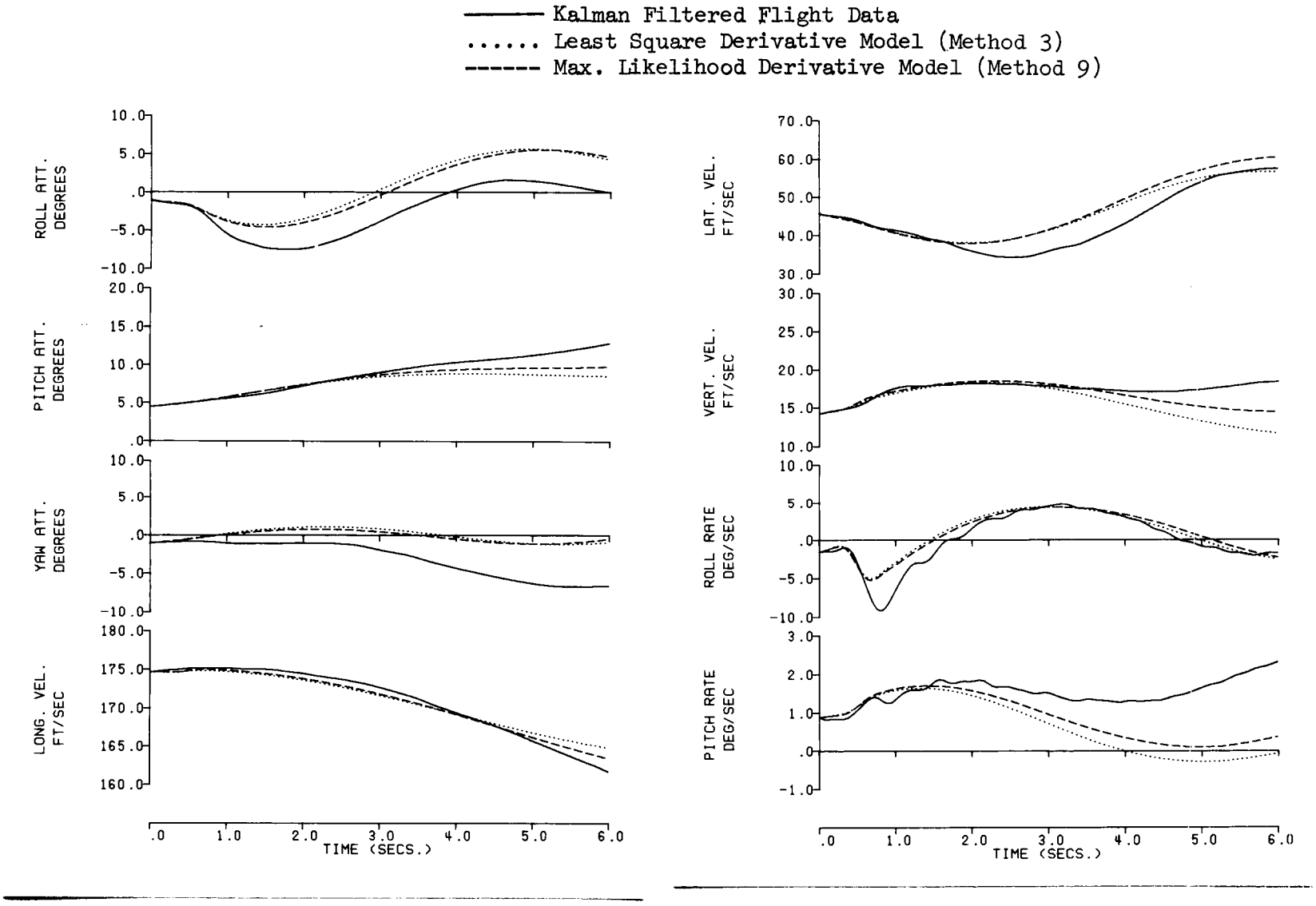
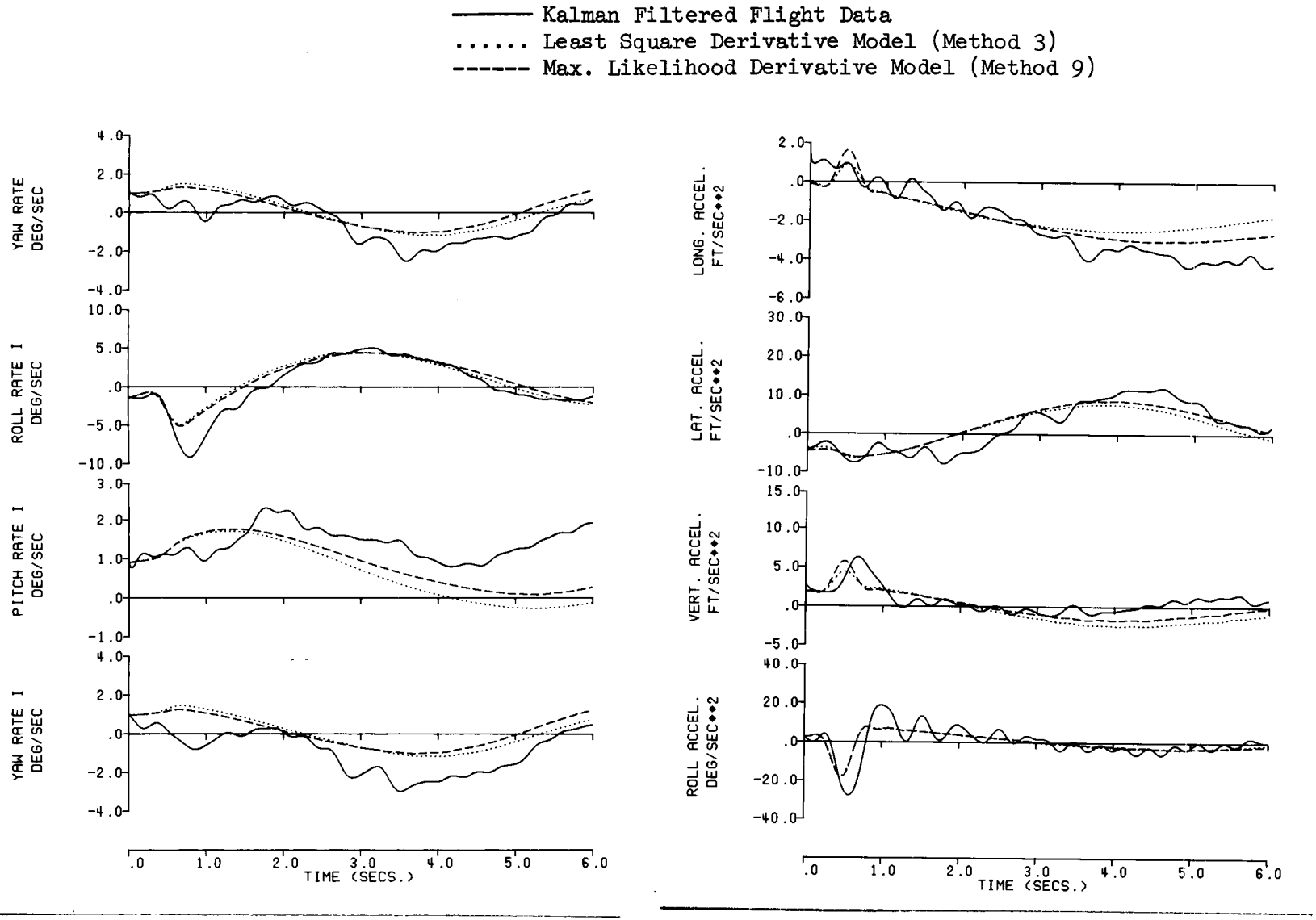


Figure 37. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 2).



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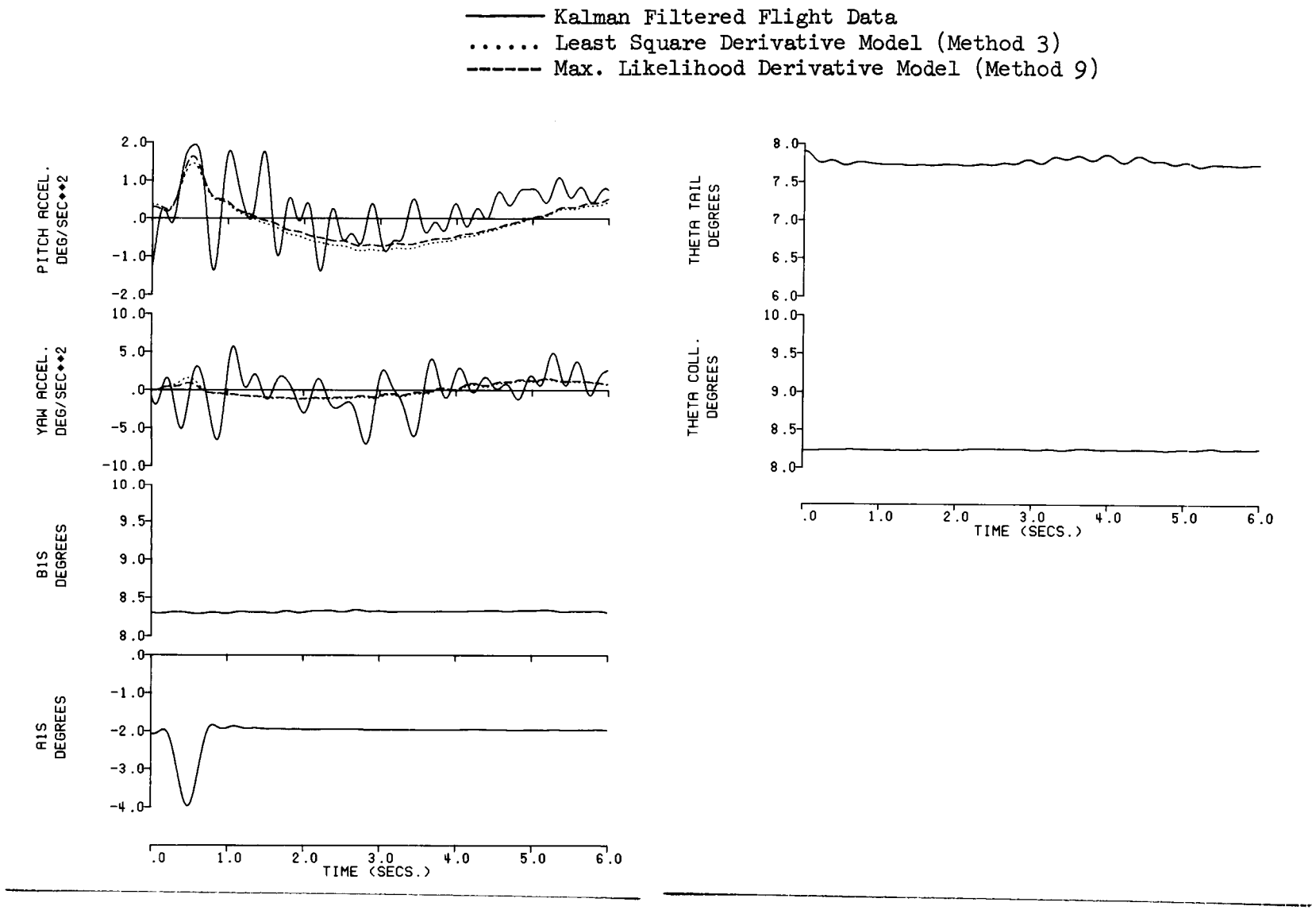

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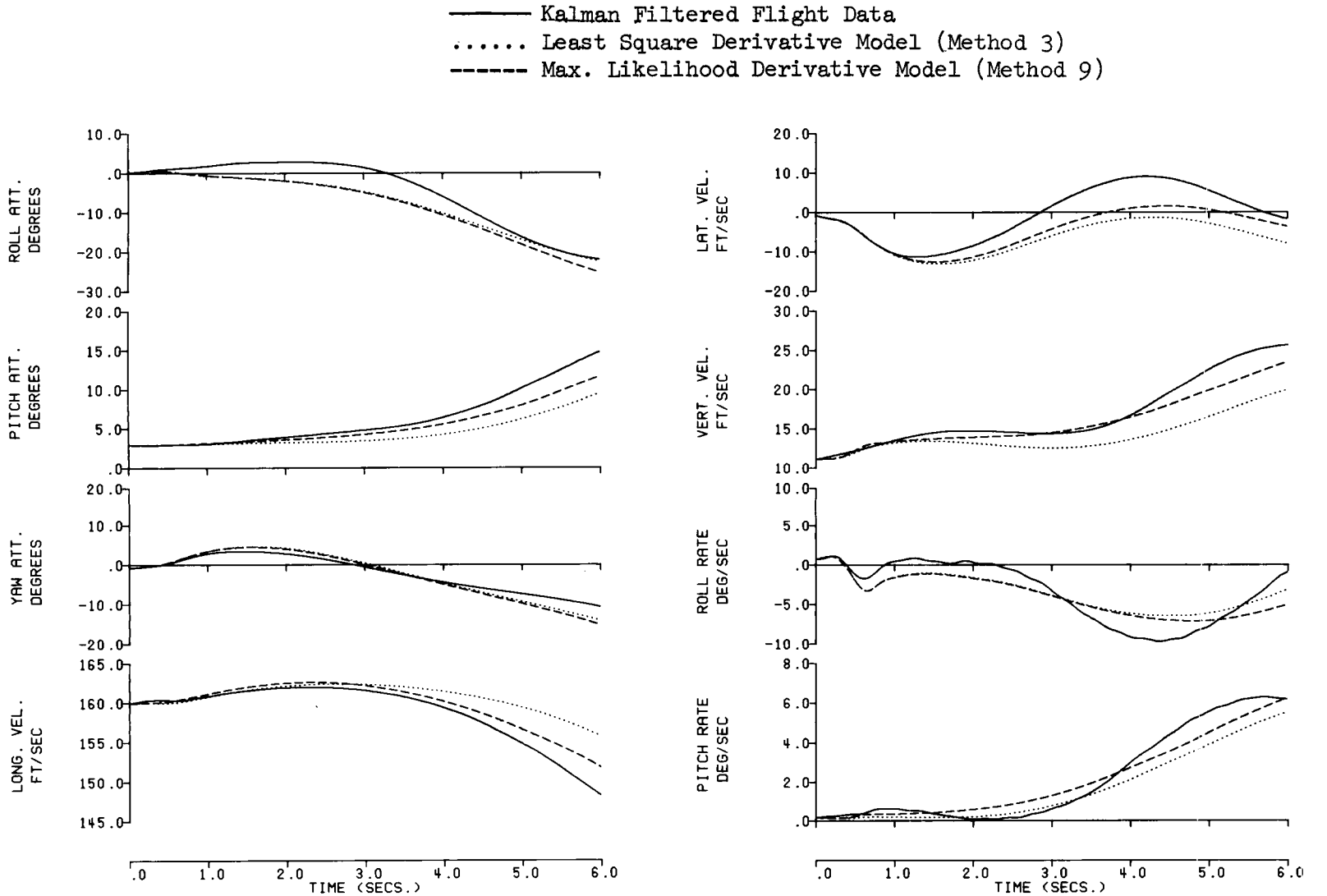


Figure 38 - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 3).

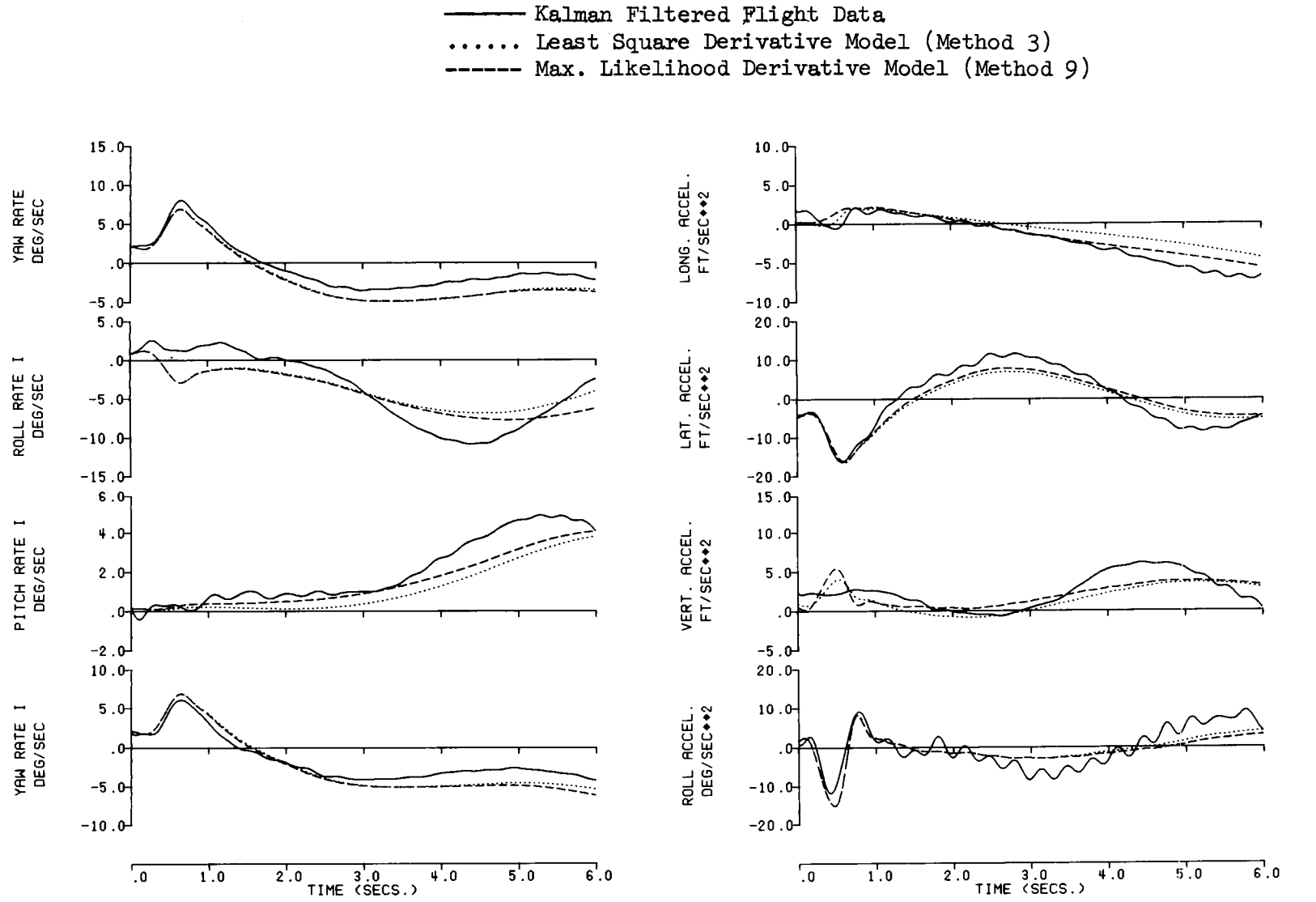
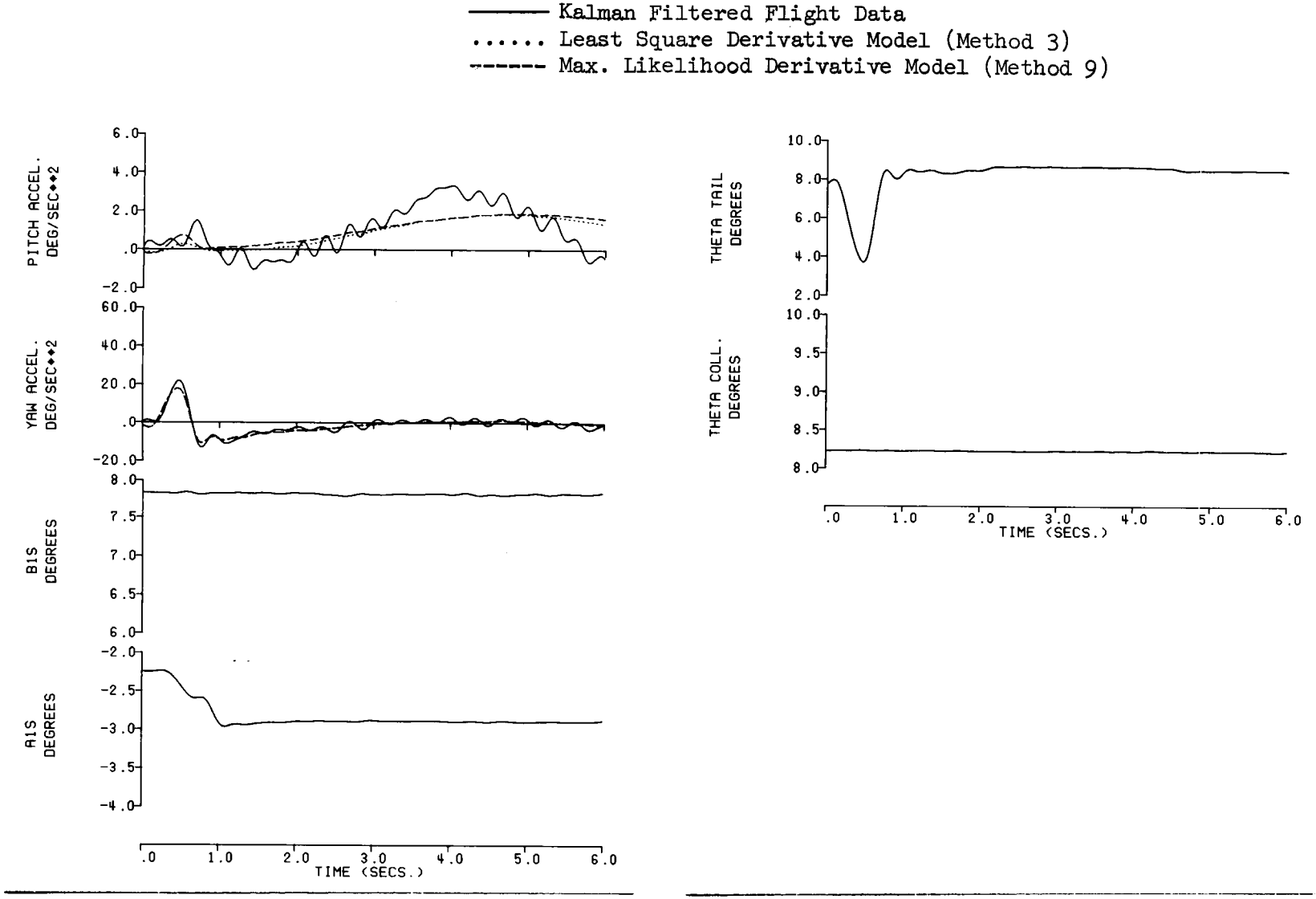


Figure 38 - Continued.



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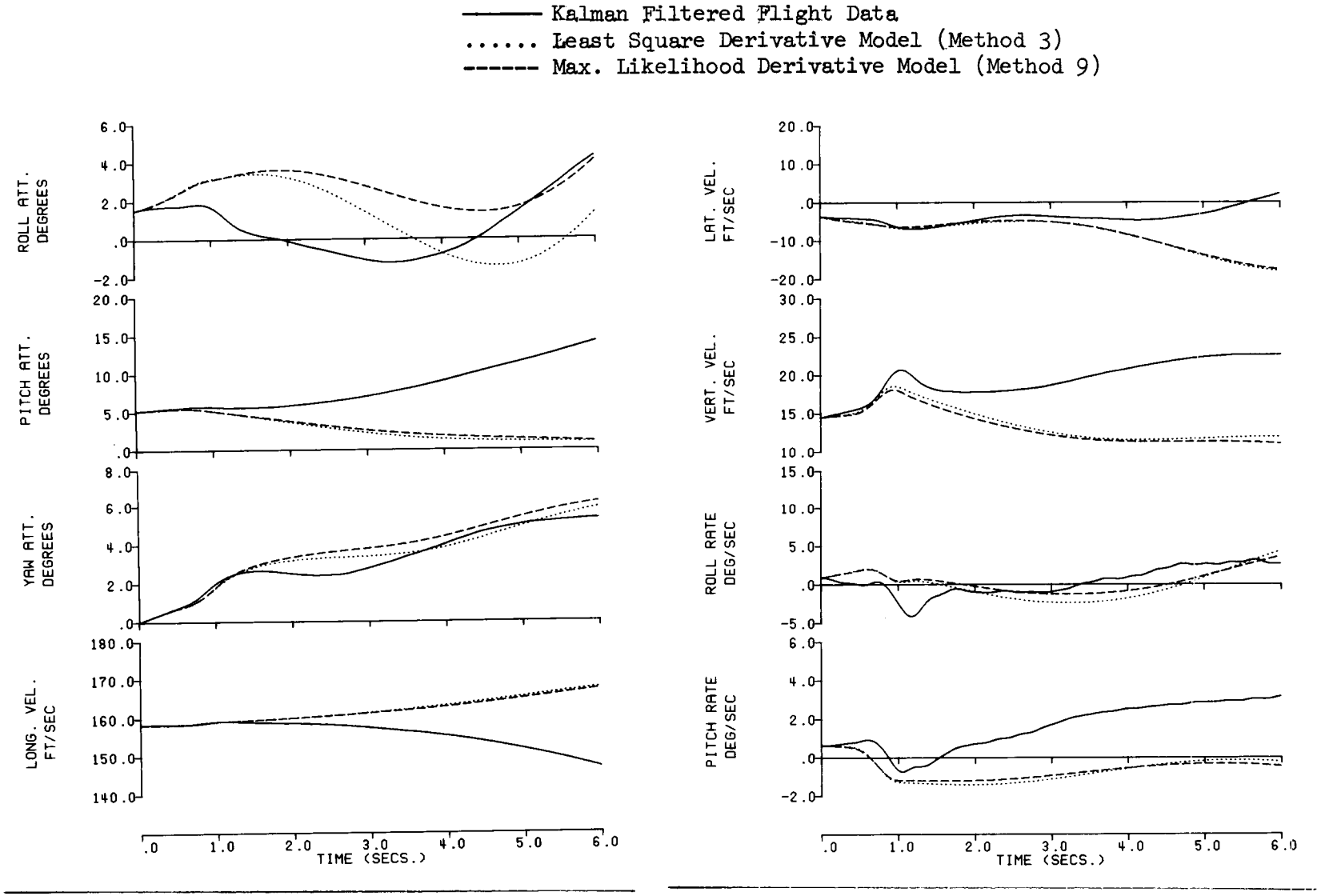


Figure 39. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 4).

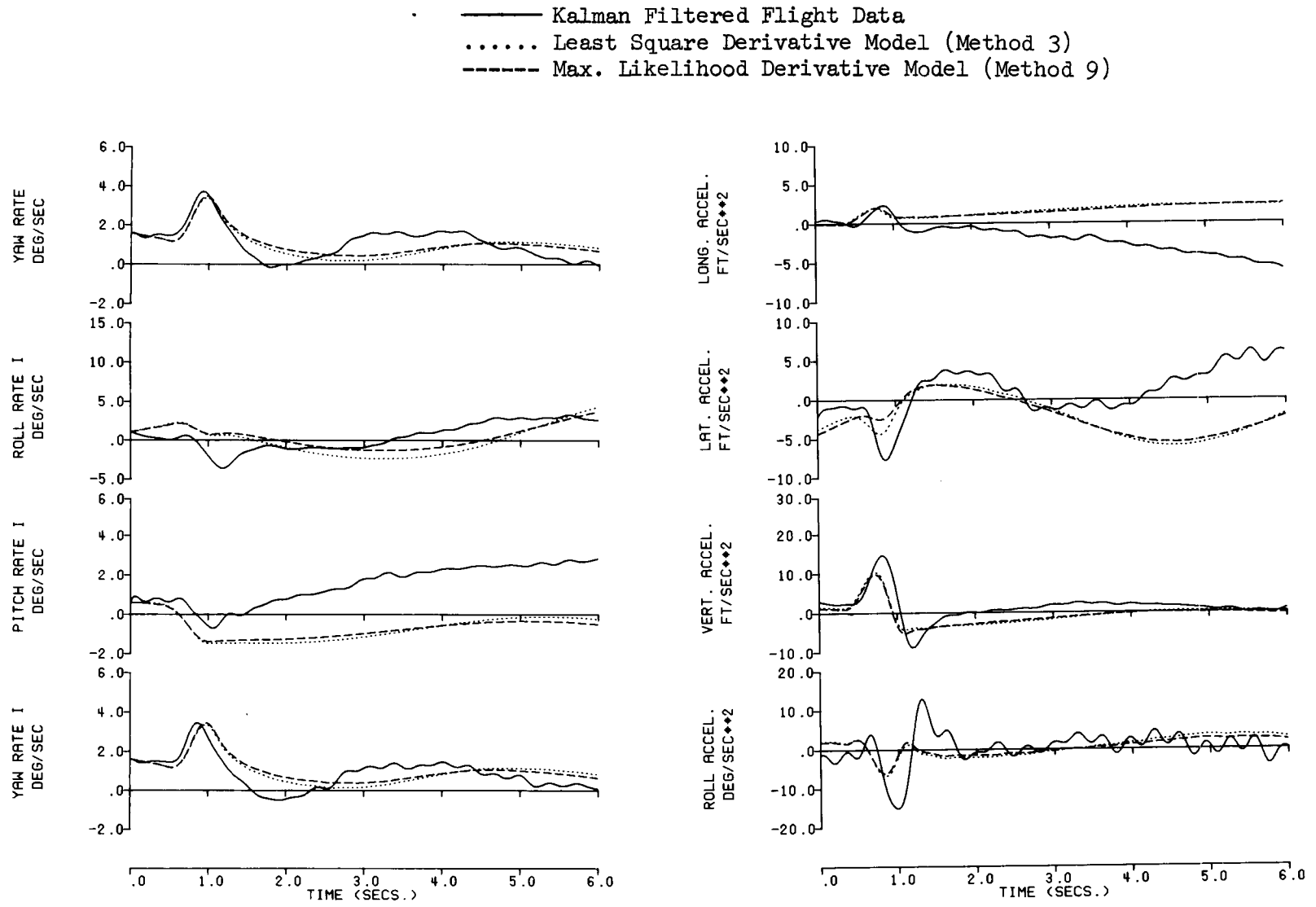
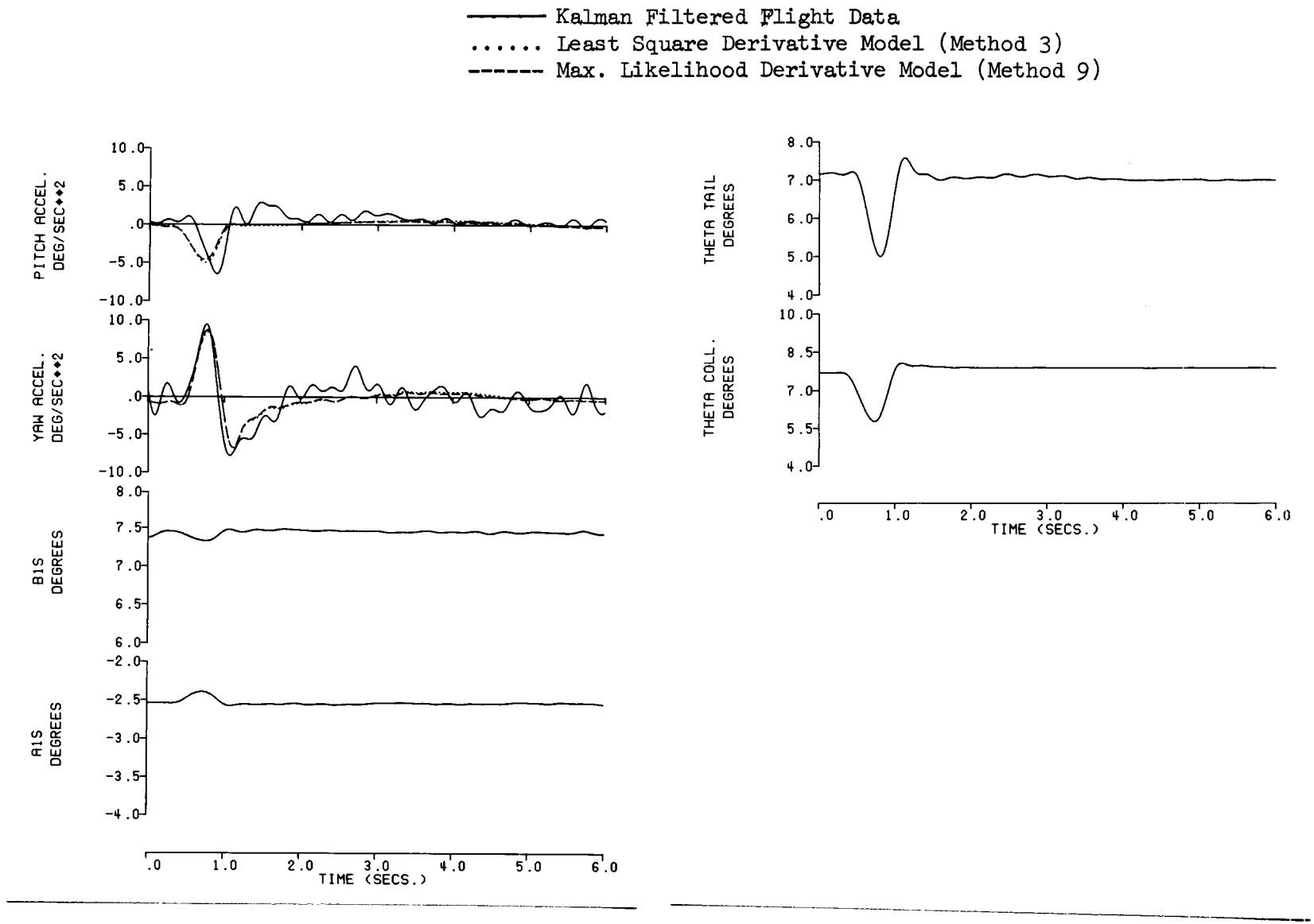


Figure 39 - Continued.



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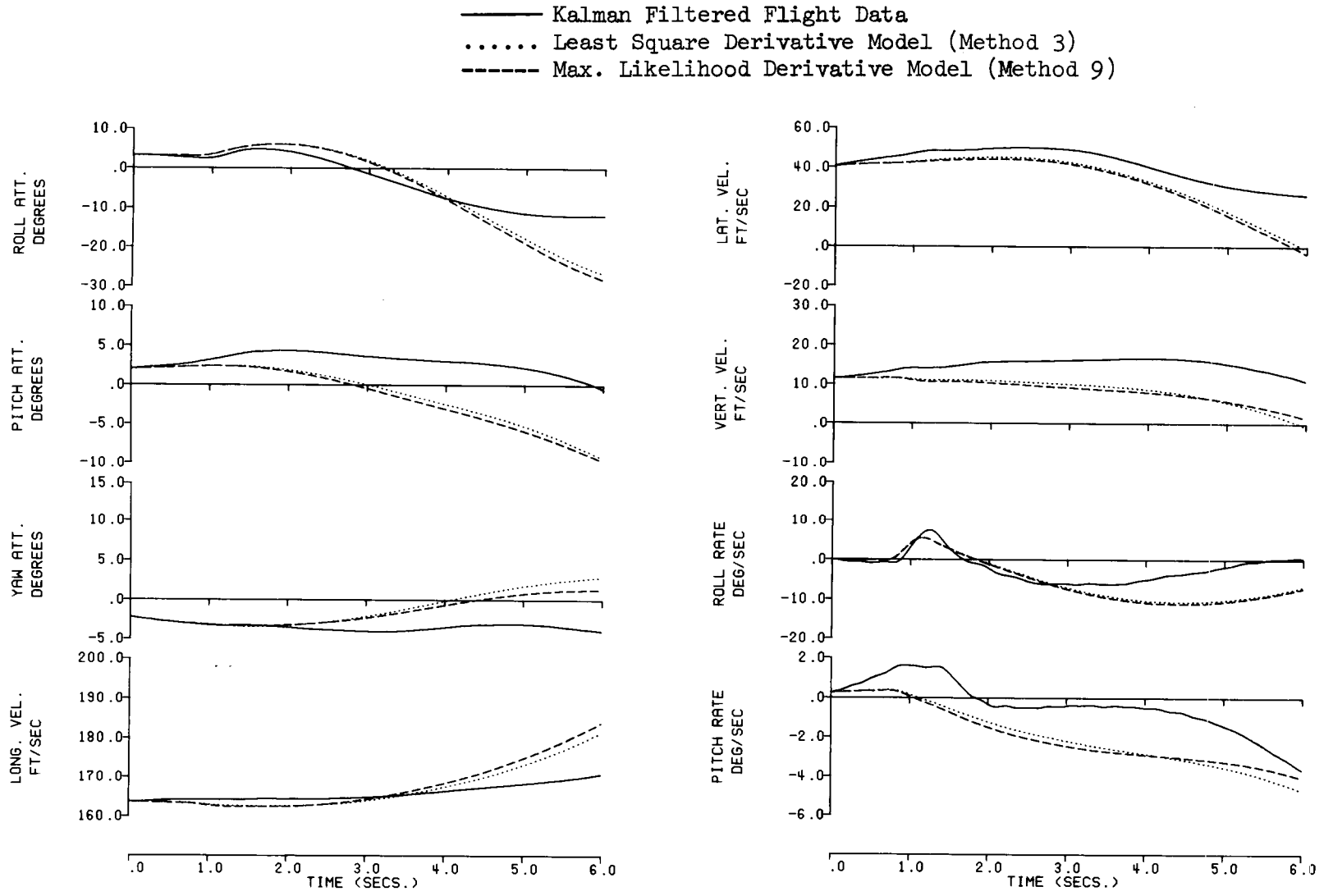


Figure 40 - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 5).

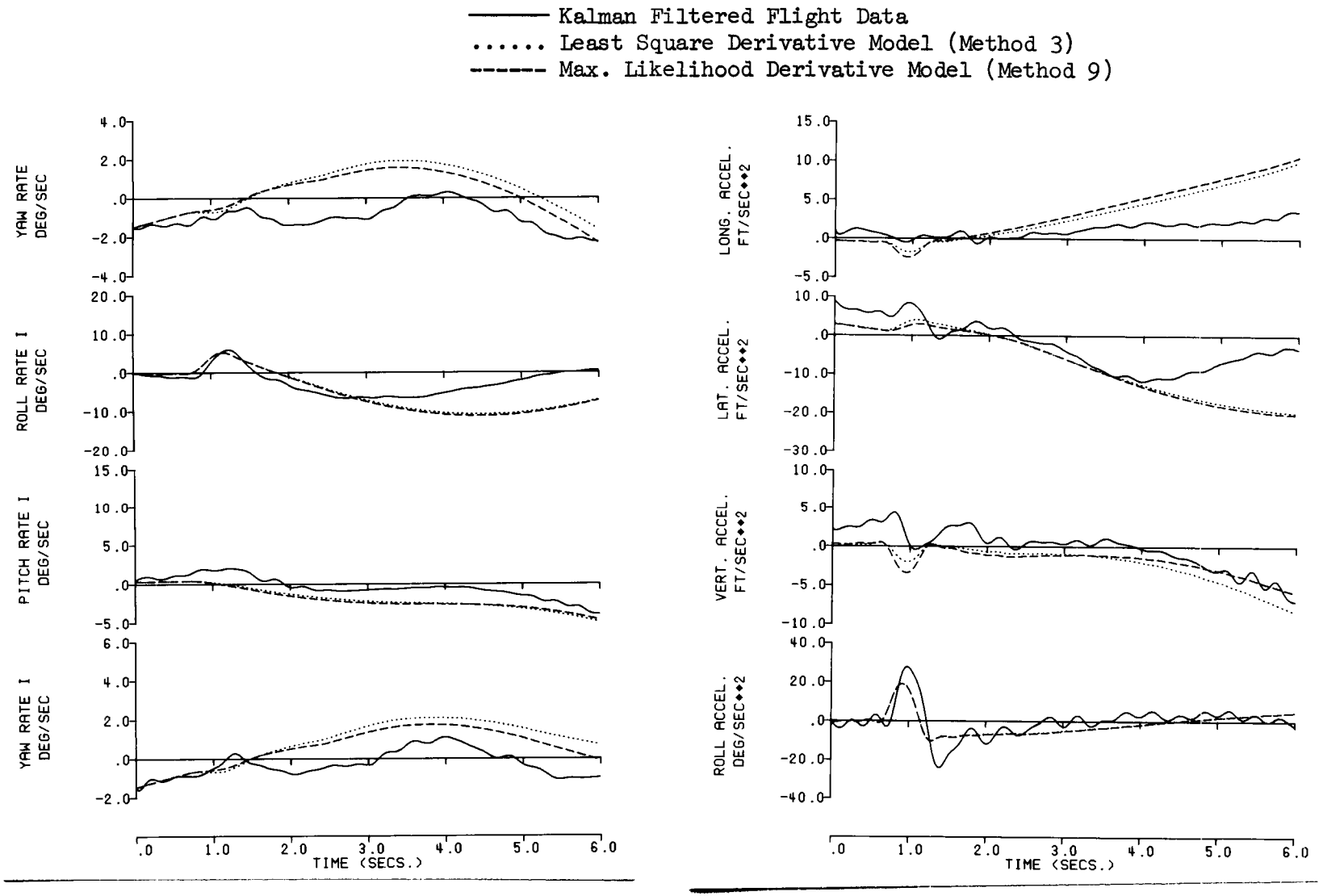


Figure 40. - Continued.

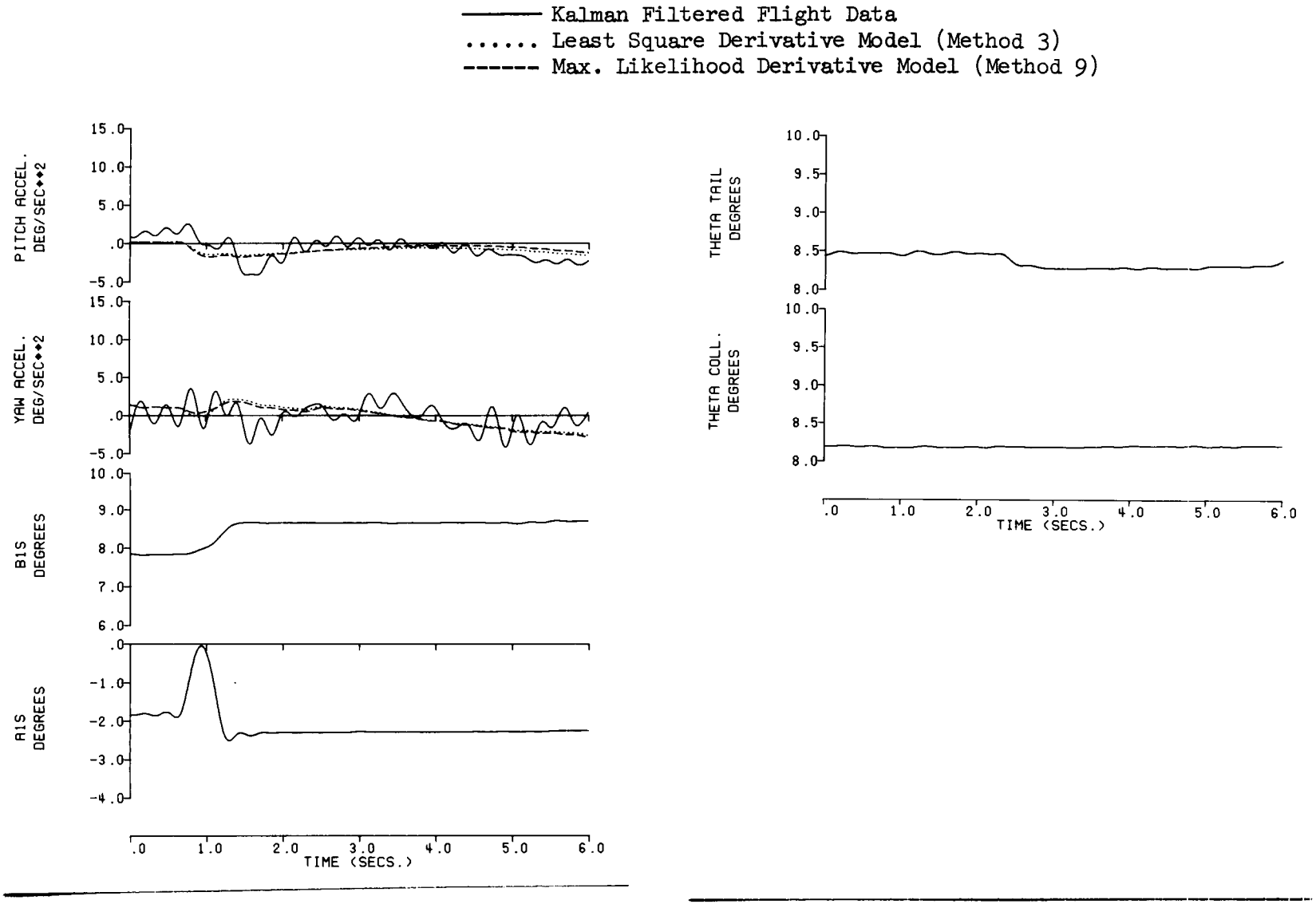


Figure 40. - Concluded.

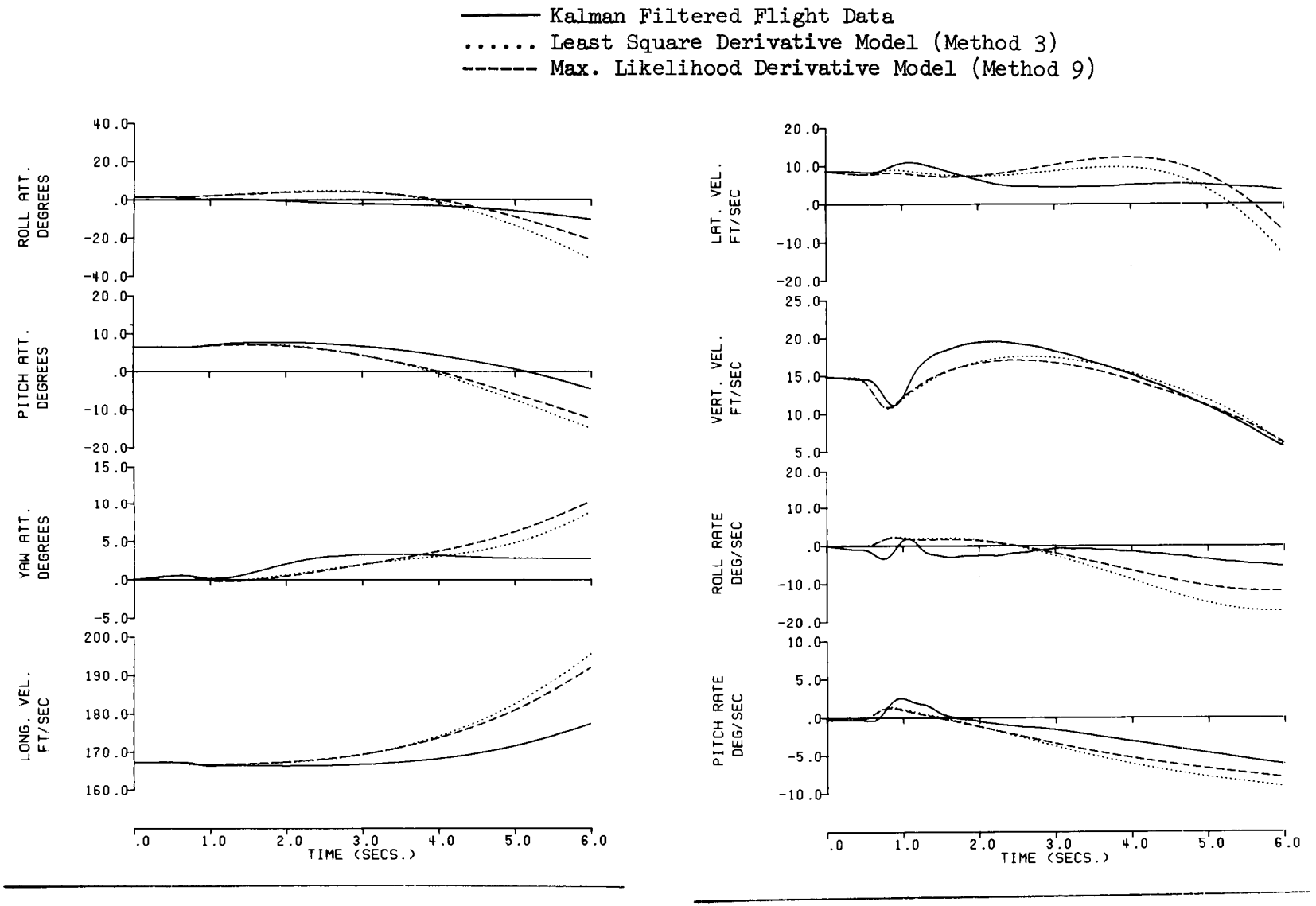
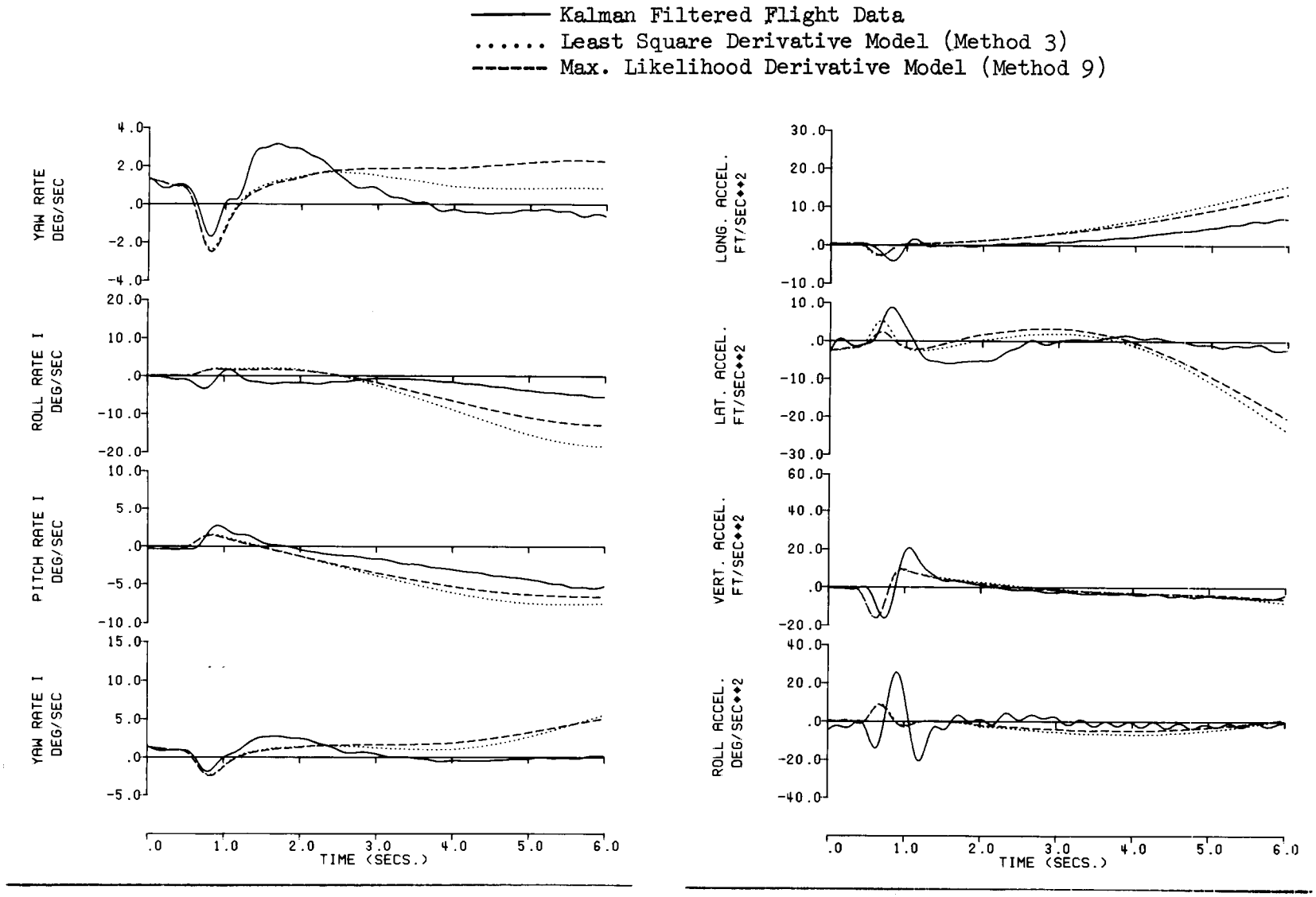


Figure 41. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (100 knots, Maneuver 6).



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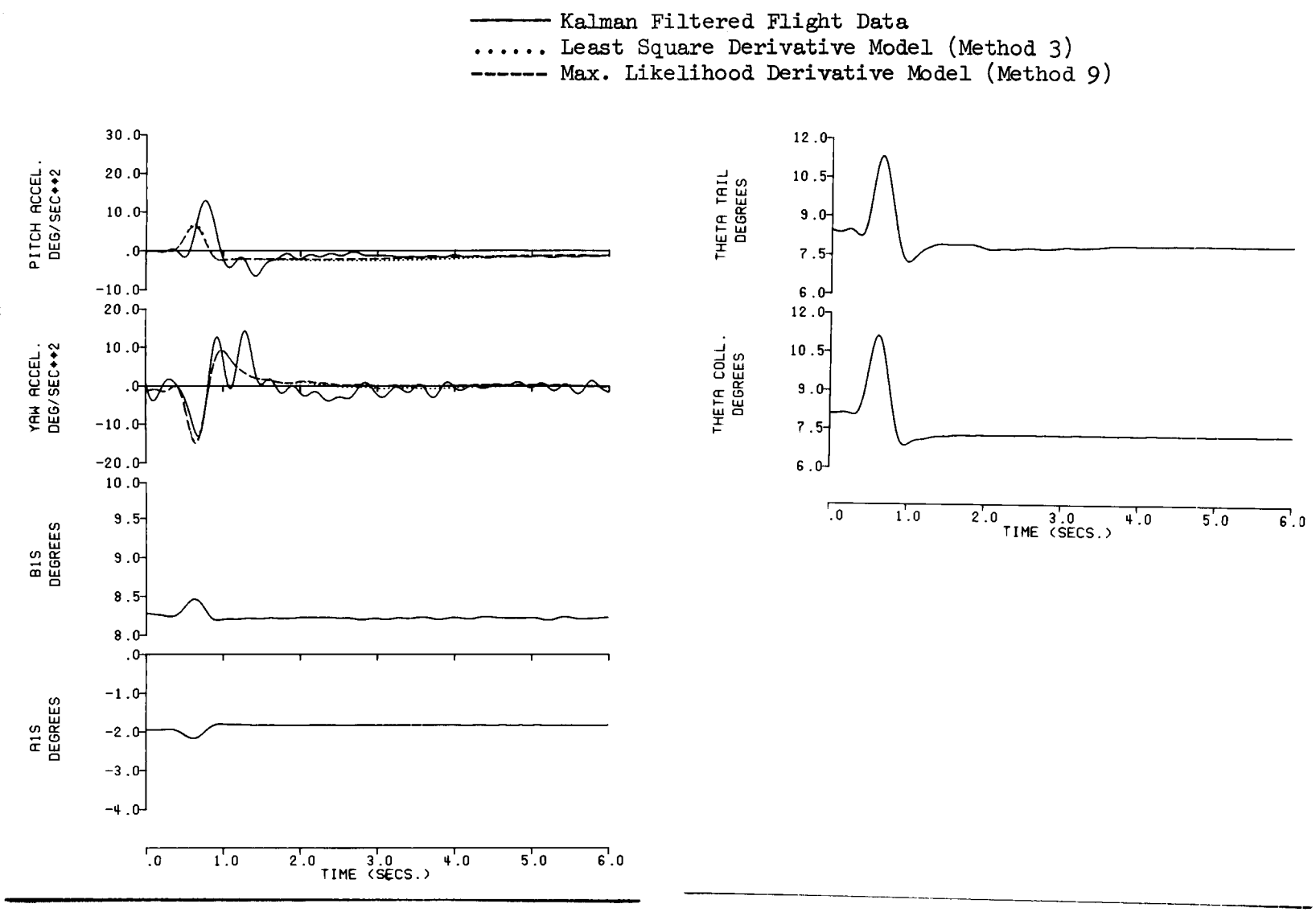

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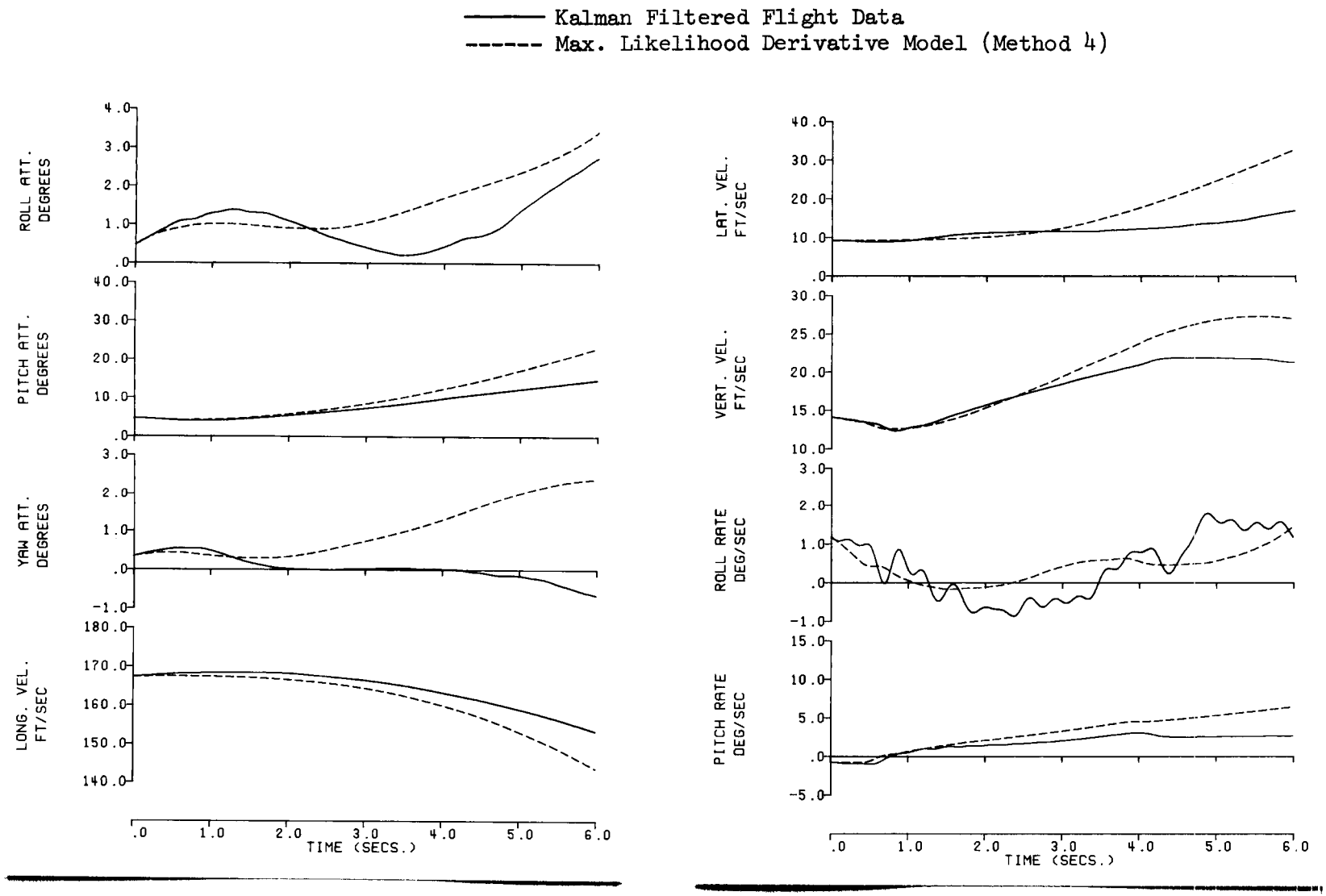


Figure 42. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 1).

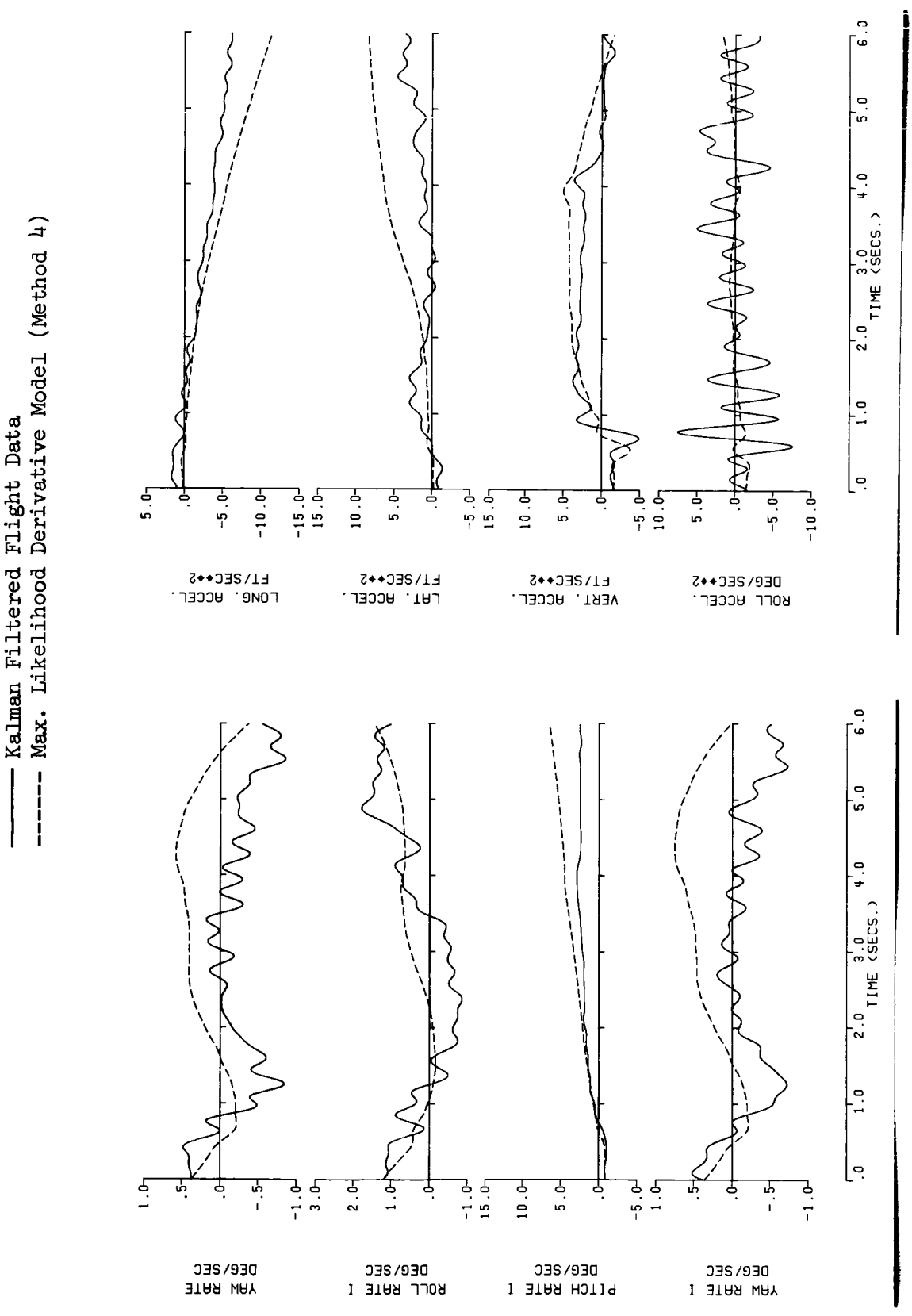
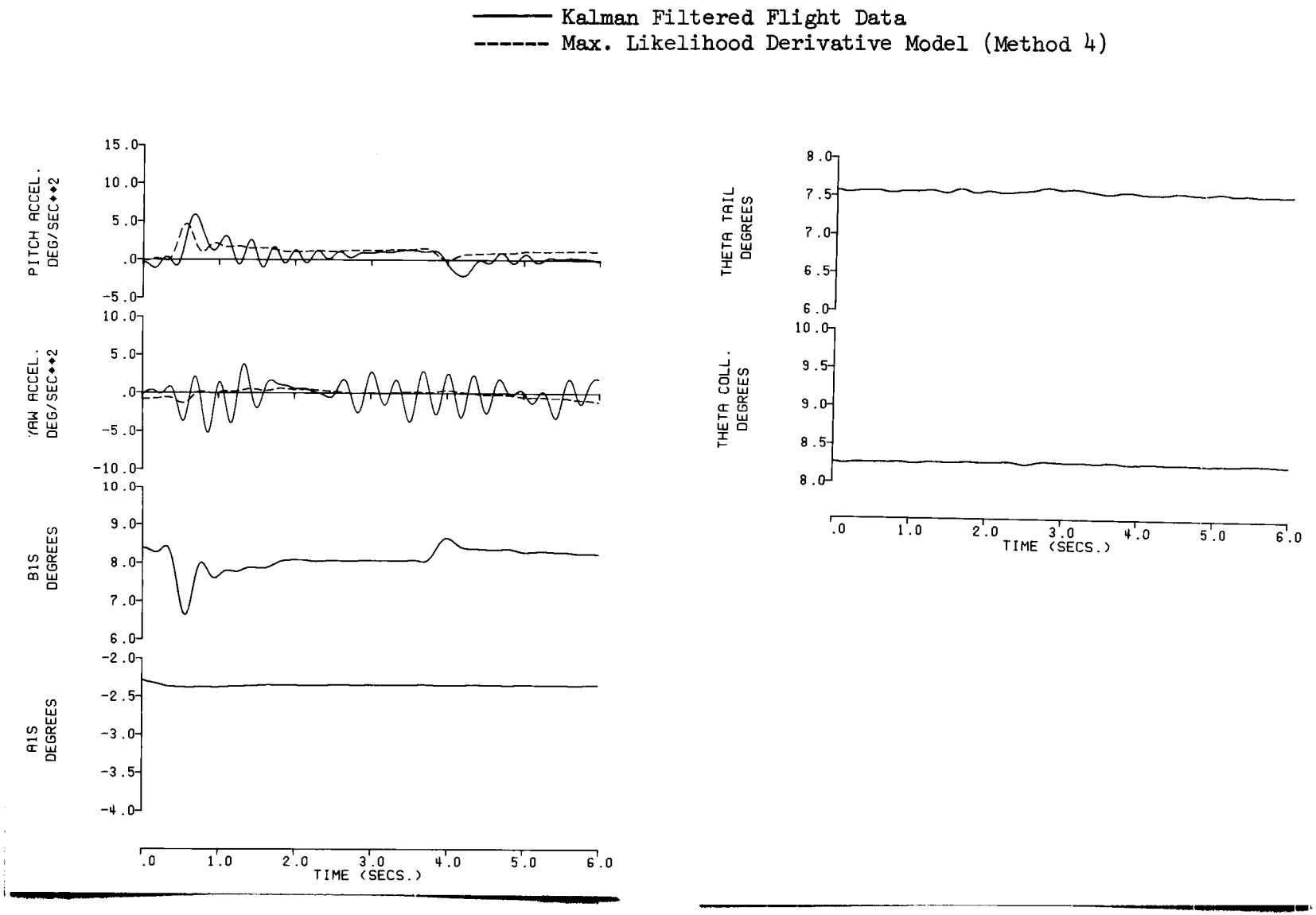


Figure 42. - Continued.



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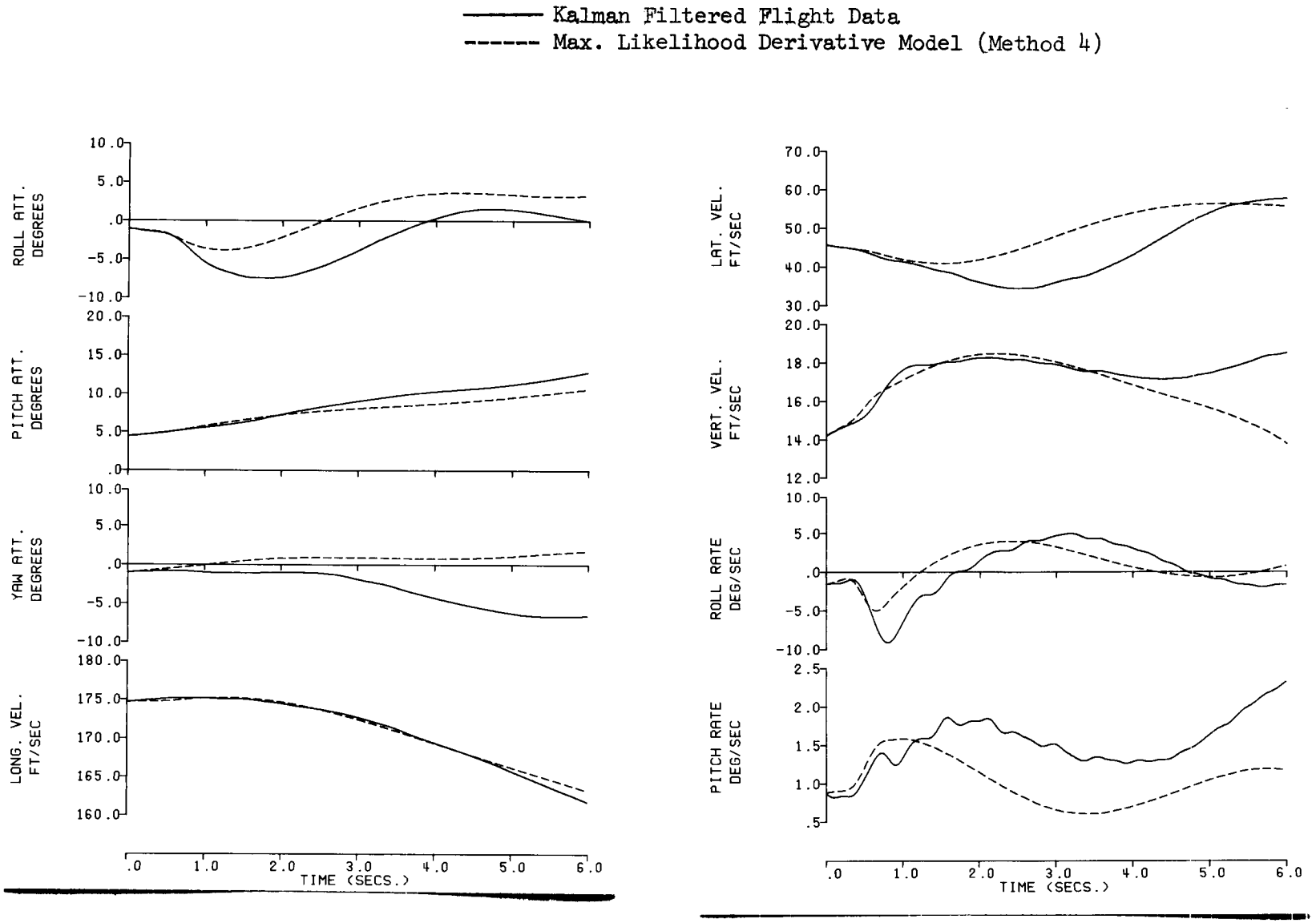
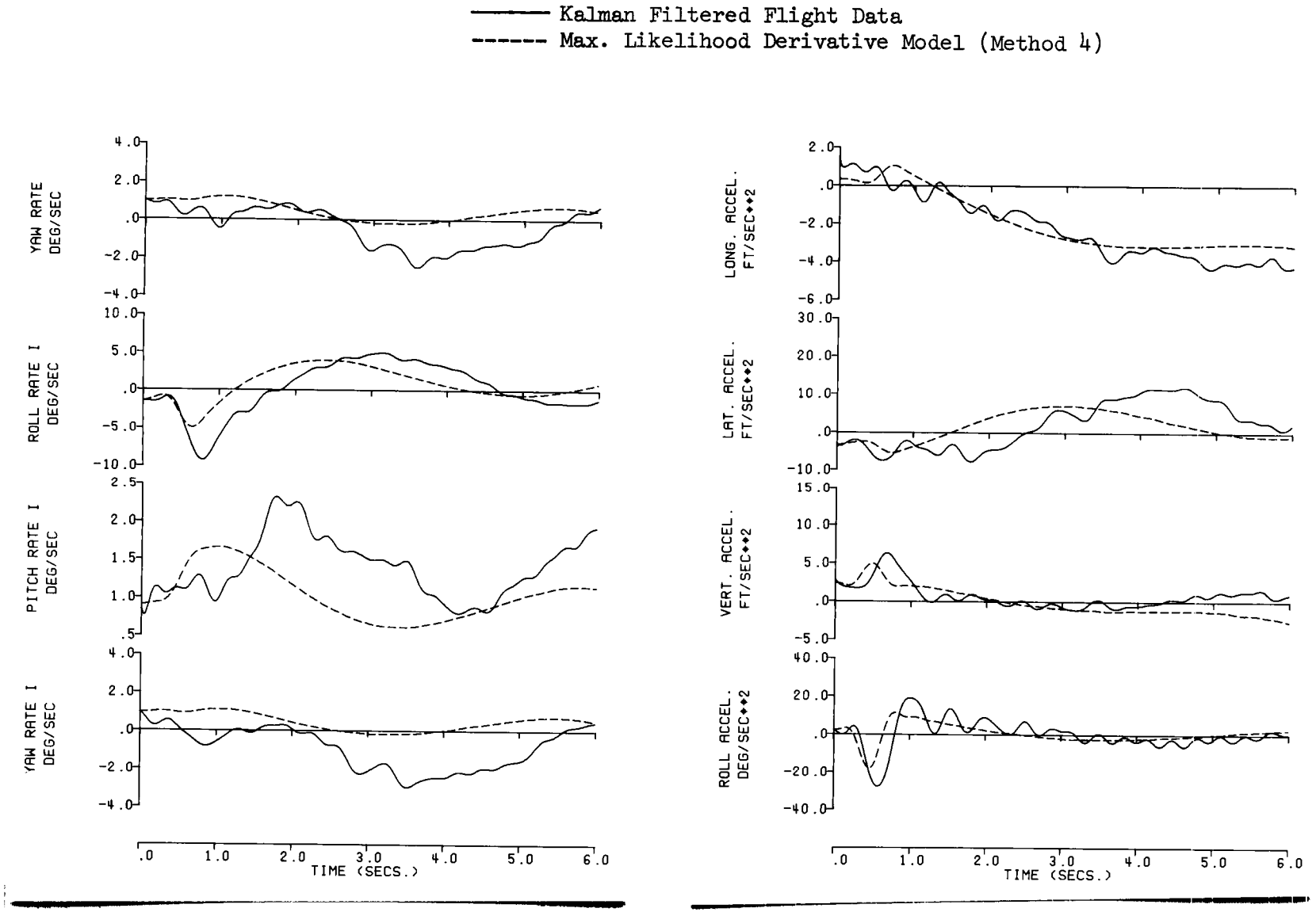


Figure 43. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 2).



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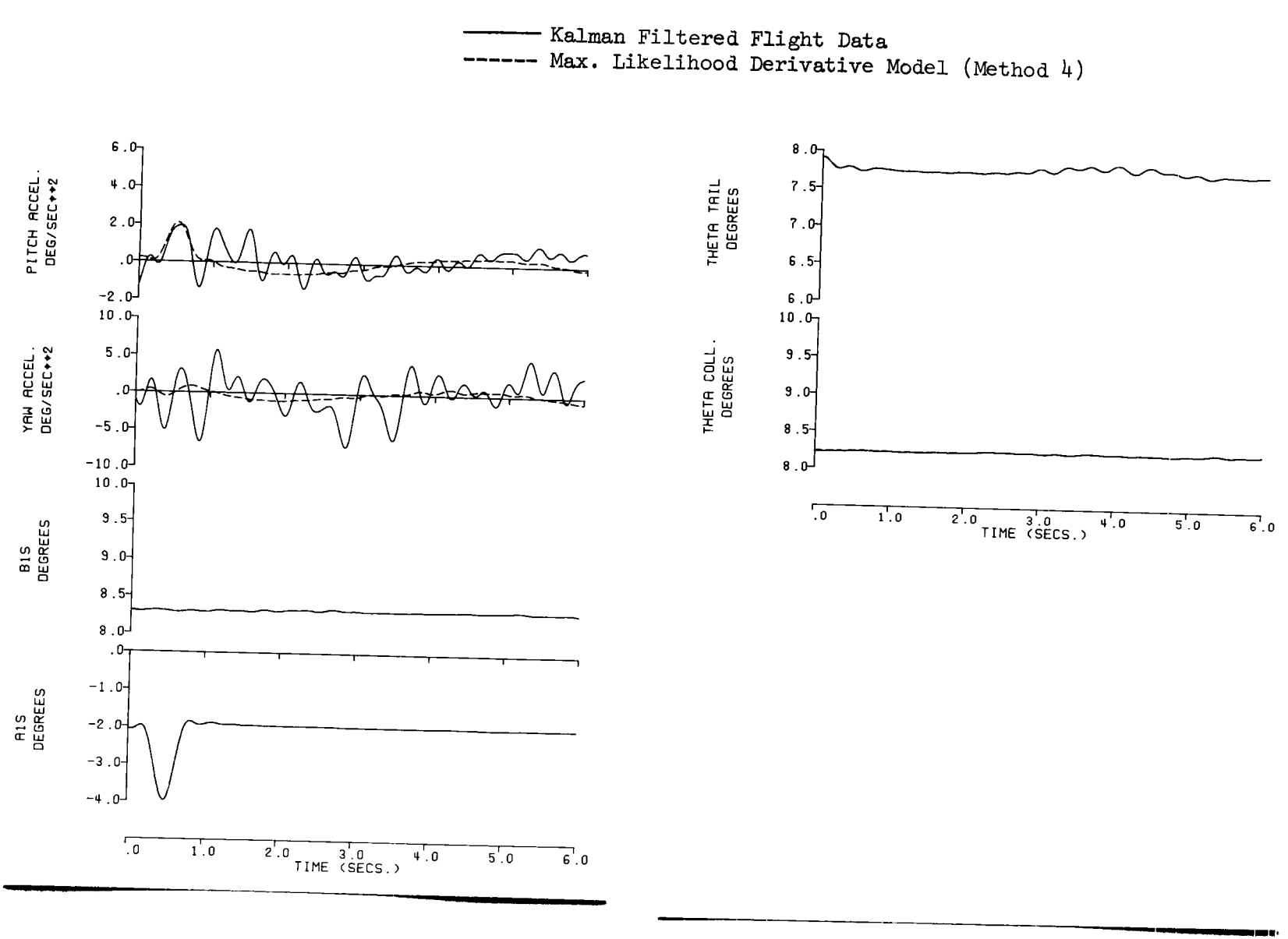


Figure 43 - Concluded.

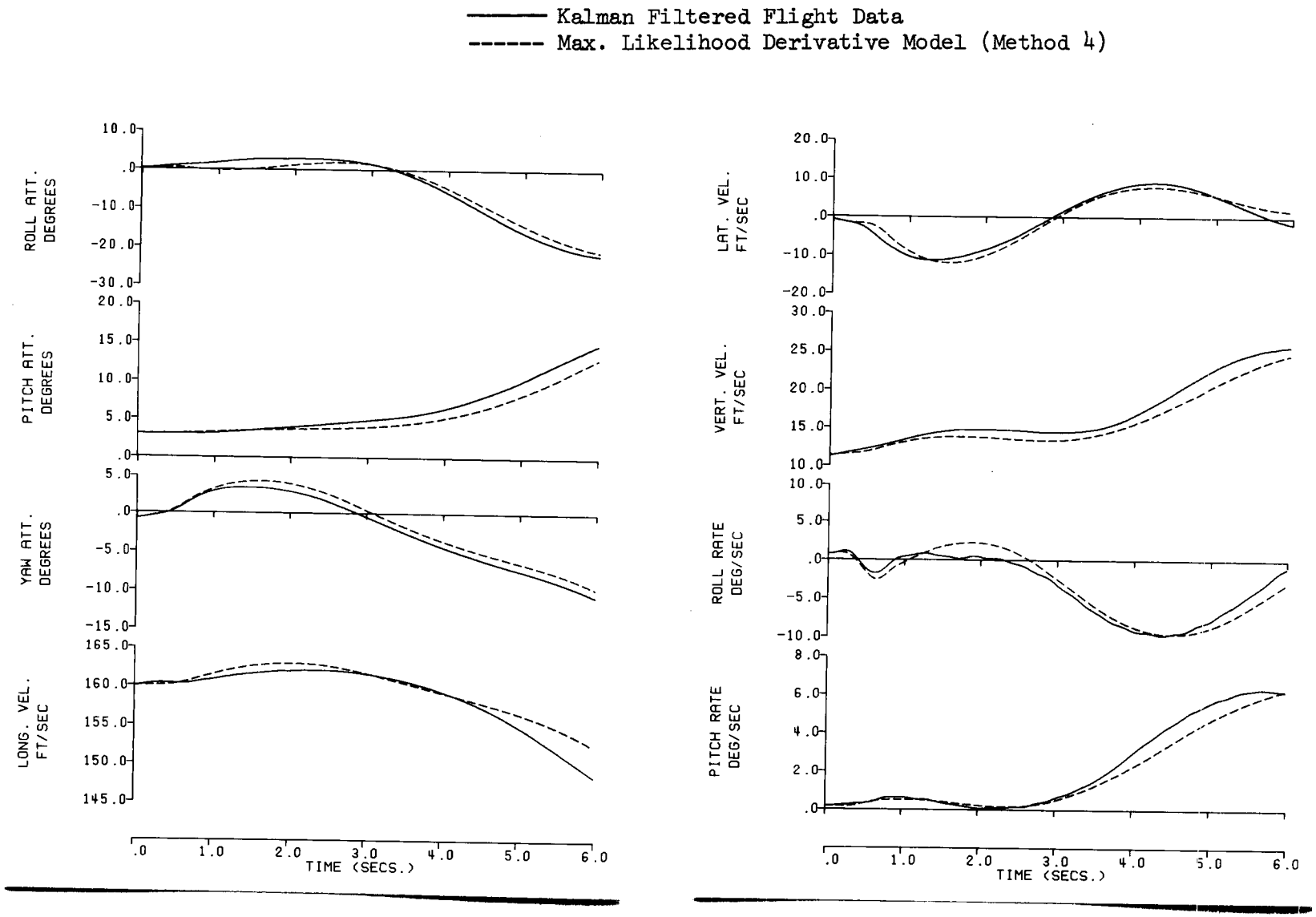
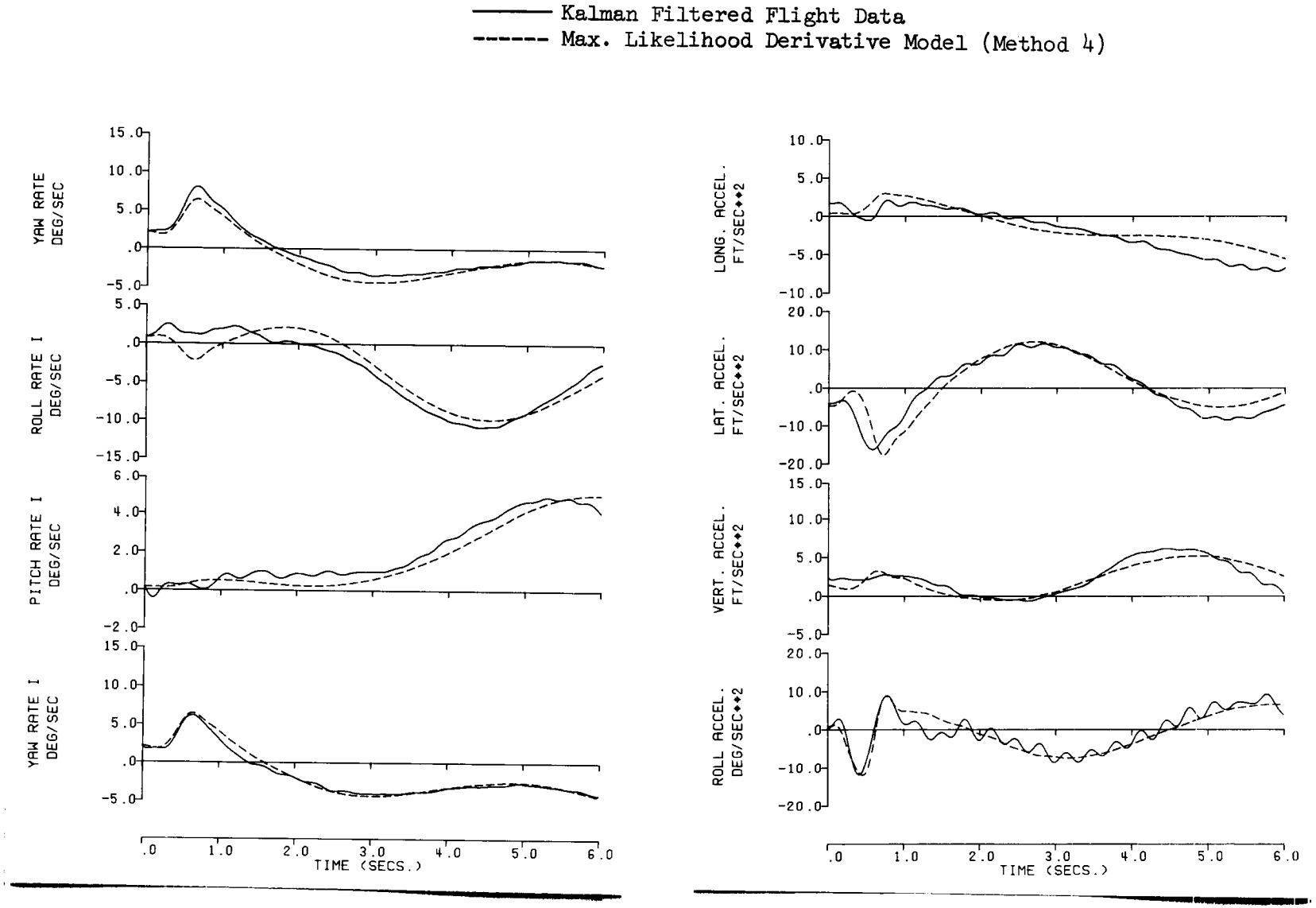


Figure 44. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 3).



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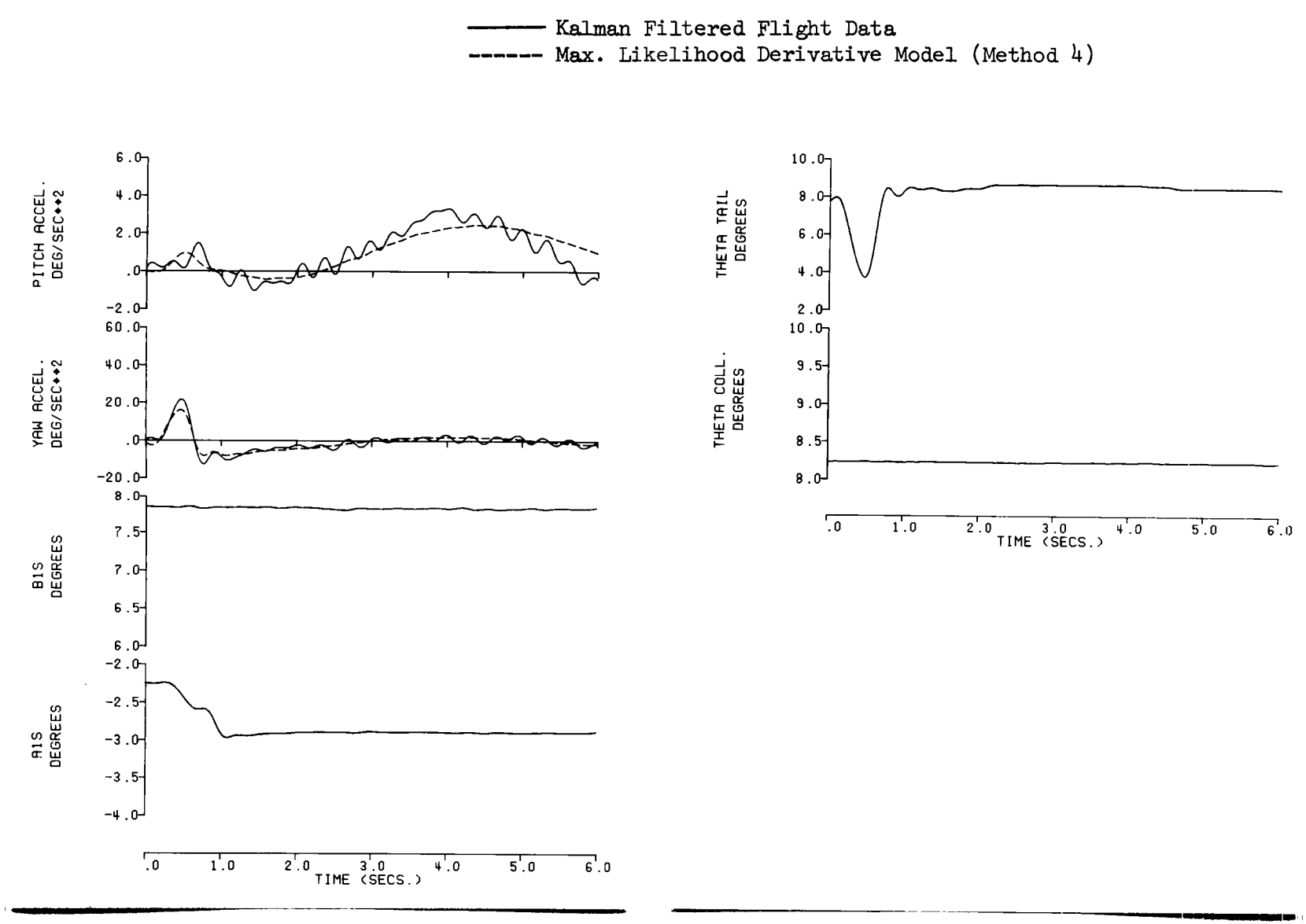

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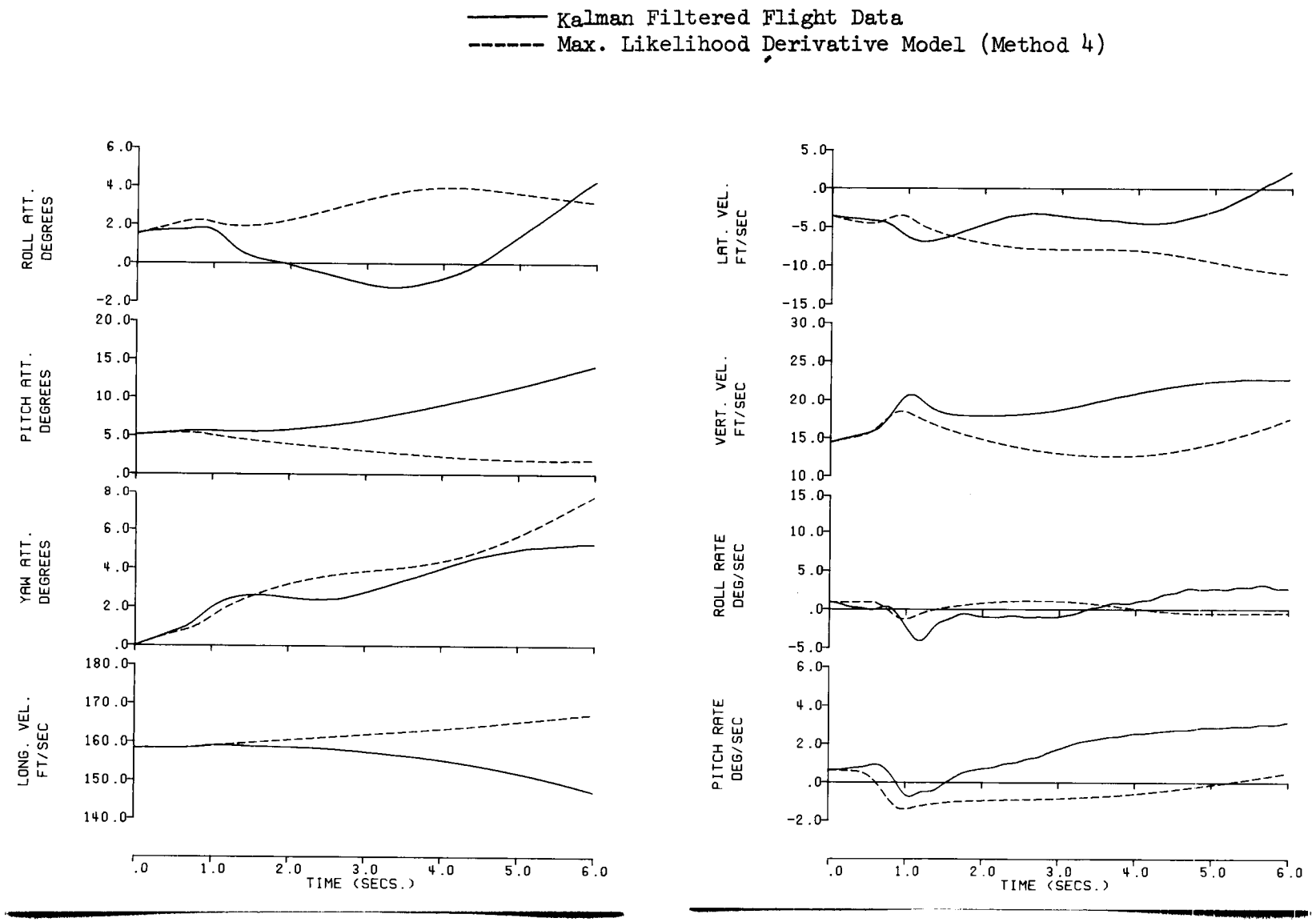
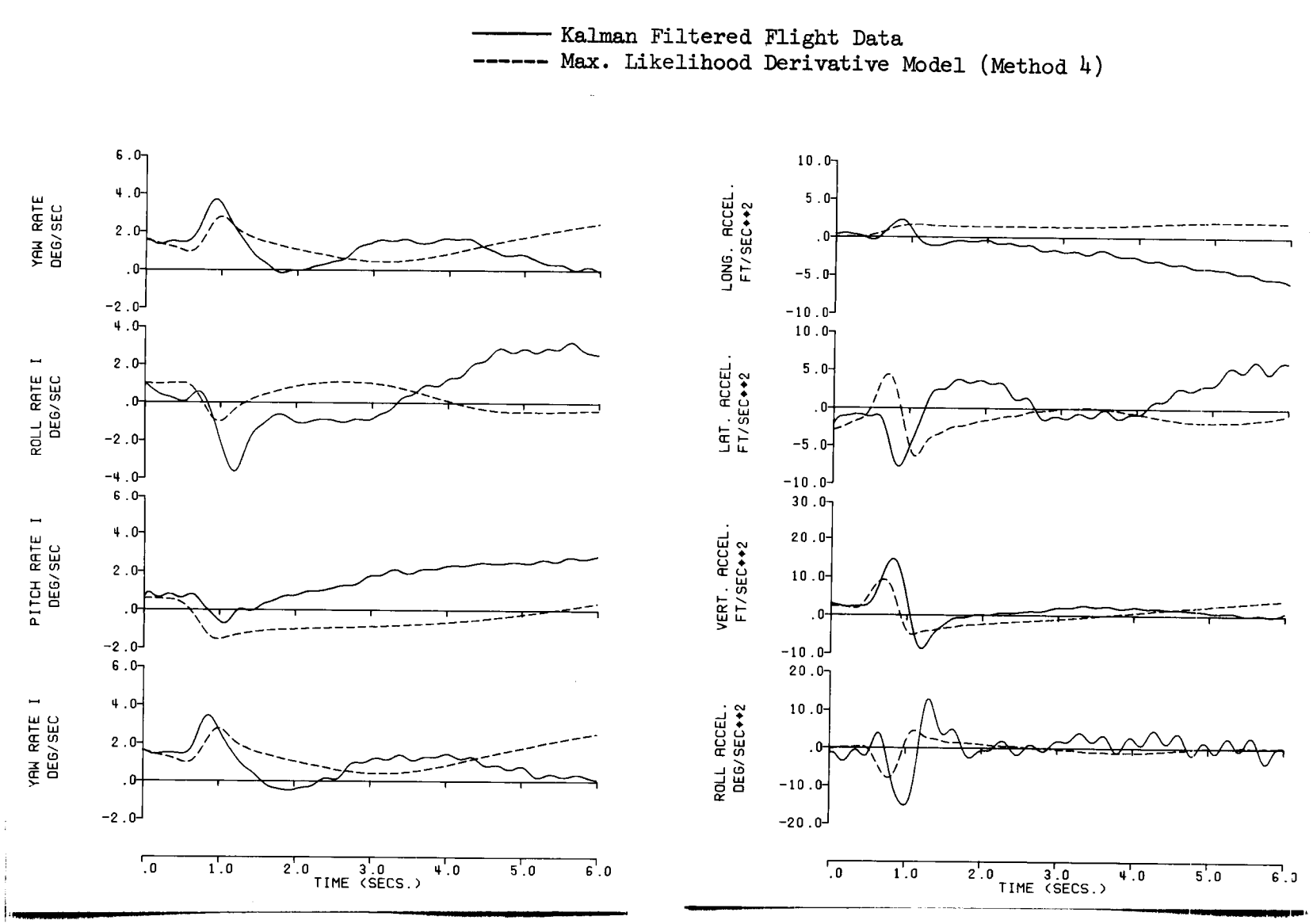


Figure 45. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 4).



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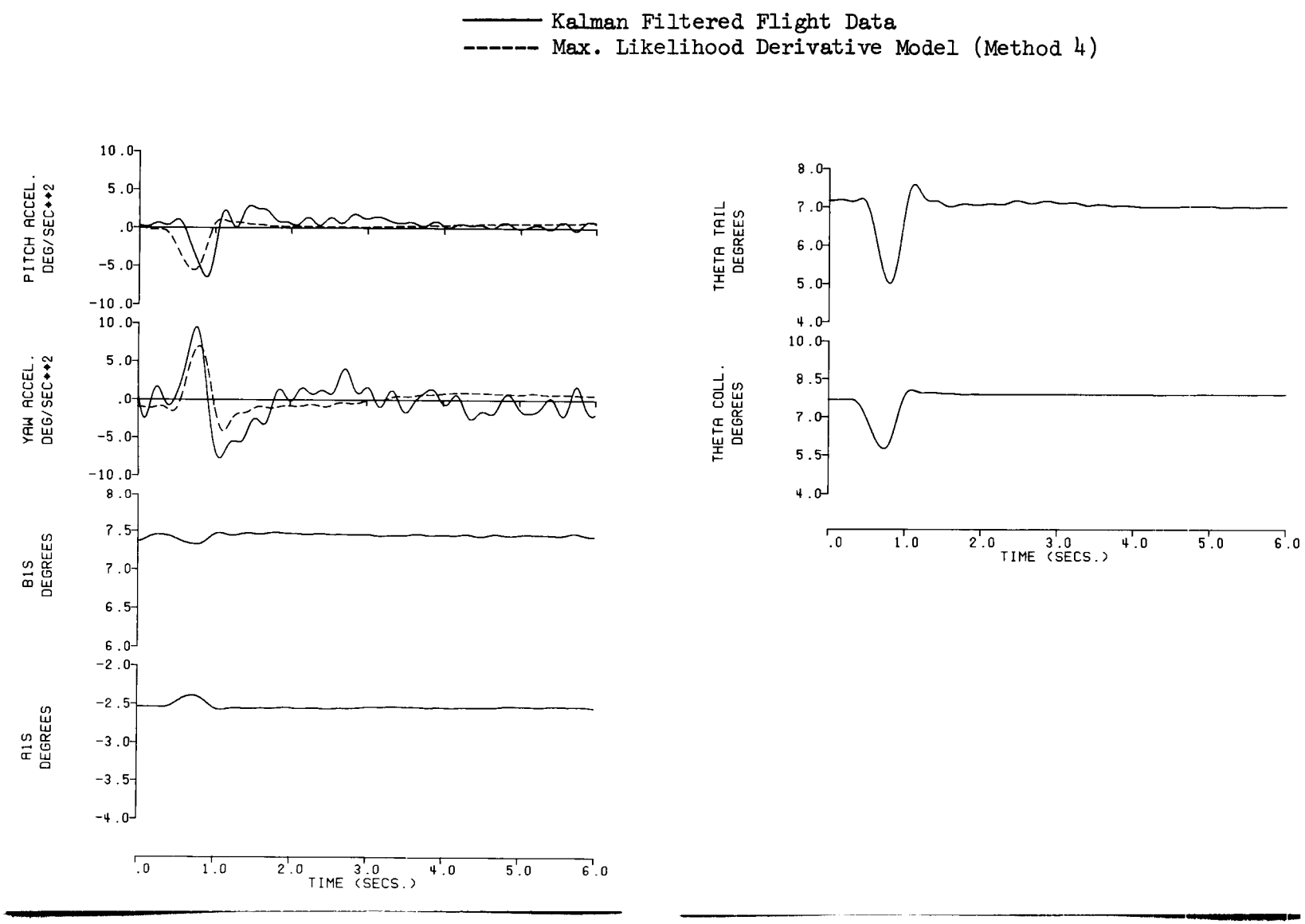

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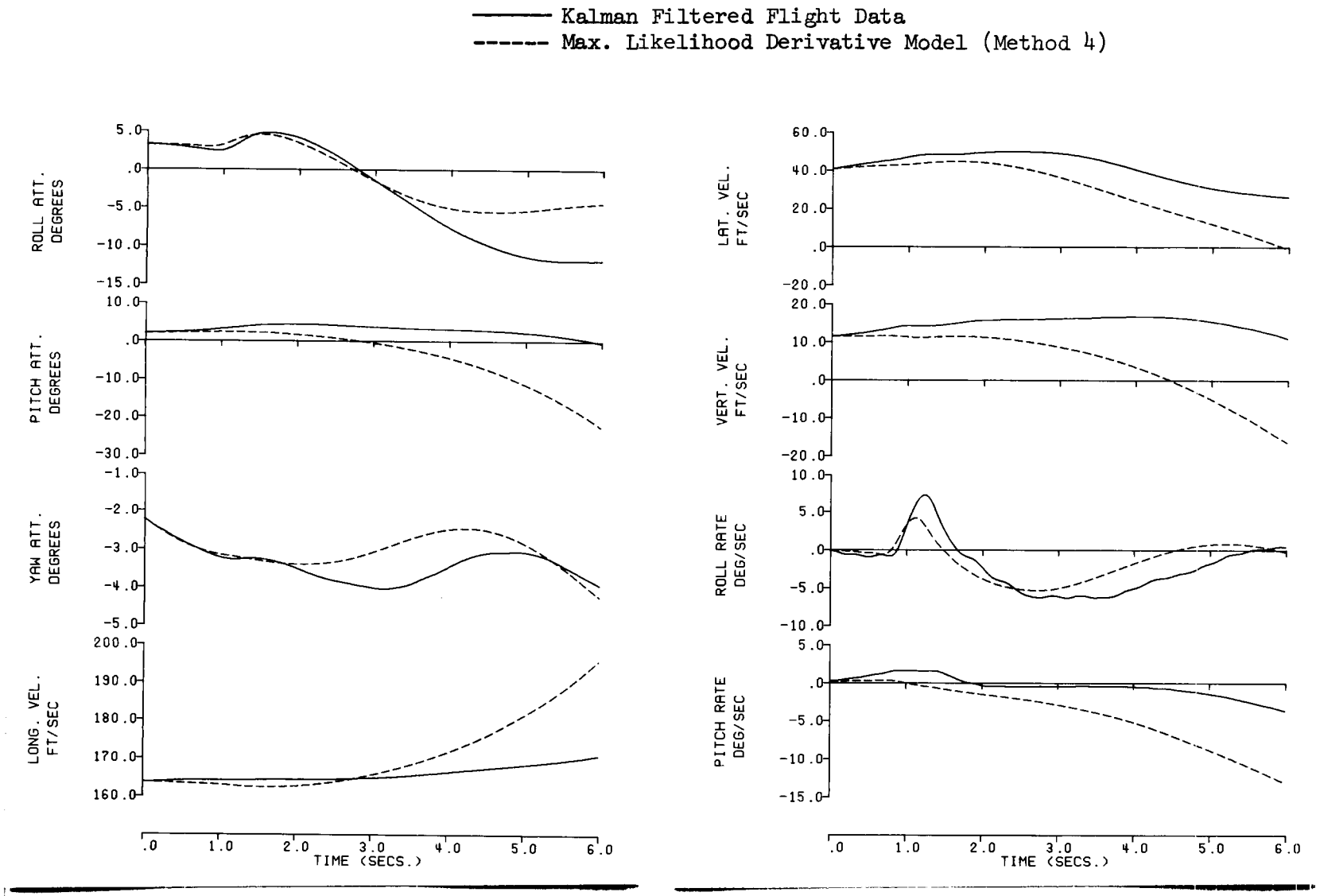
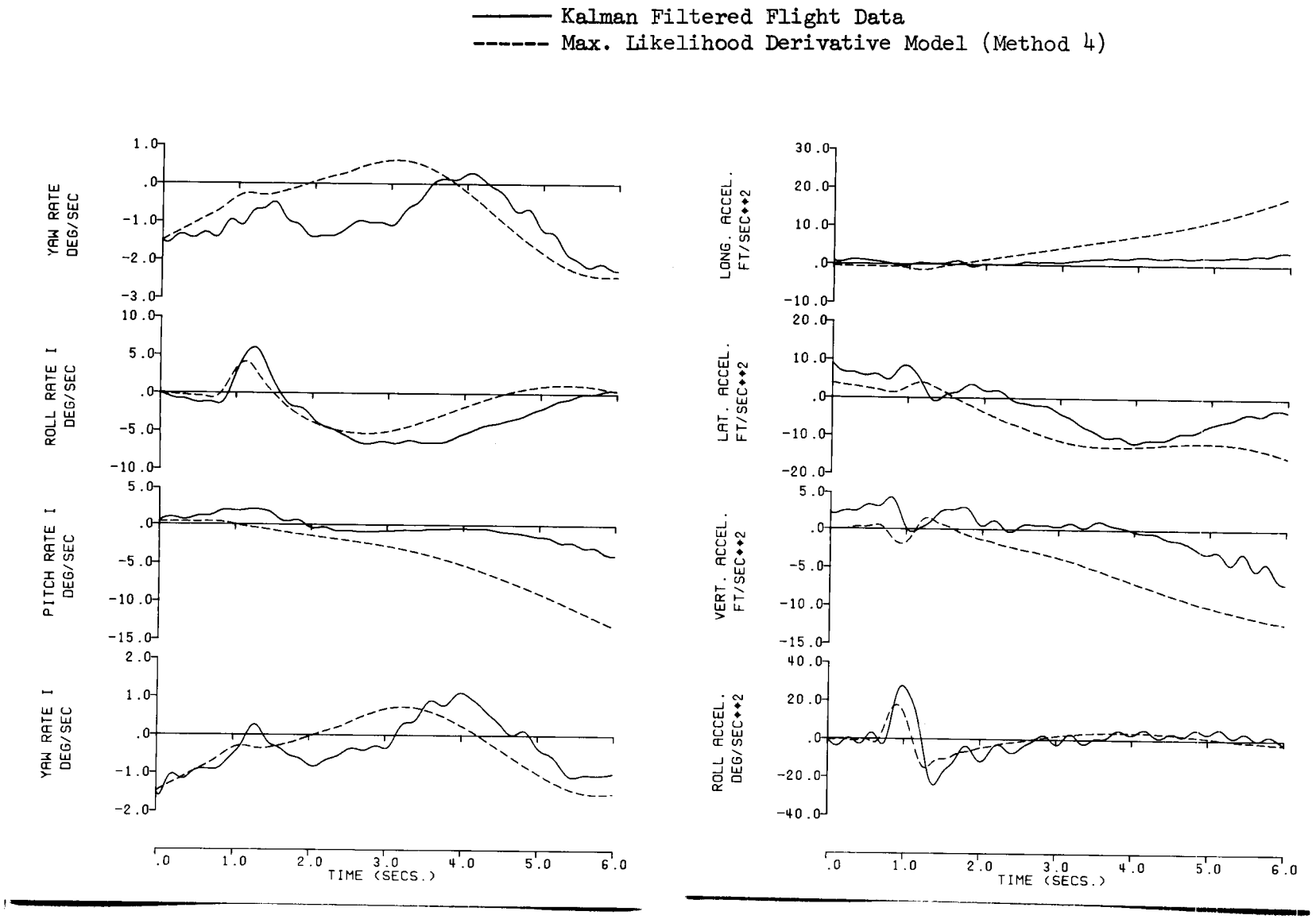


Figure 46. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 5).



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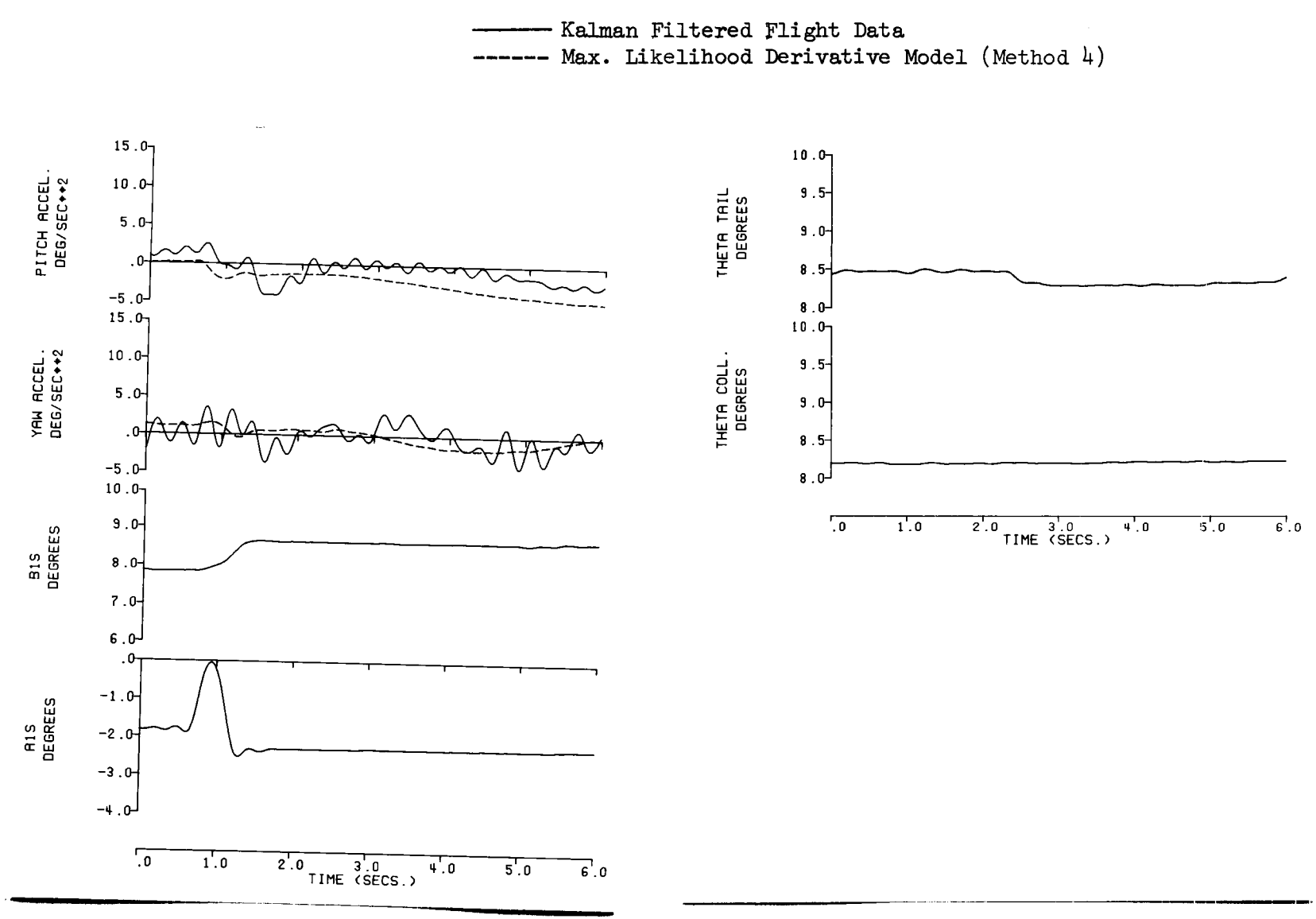

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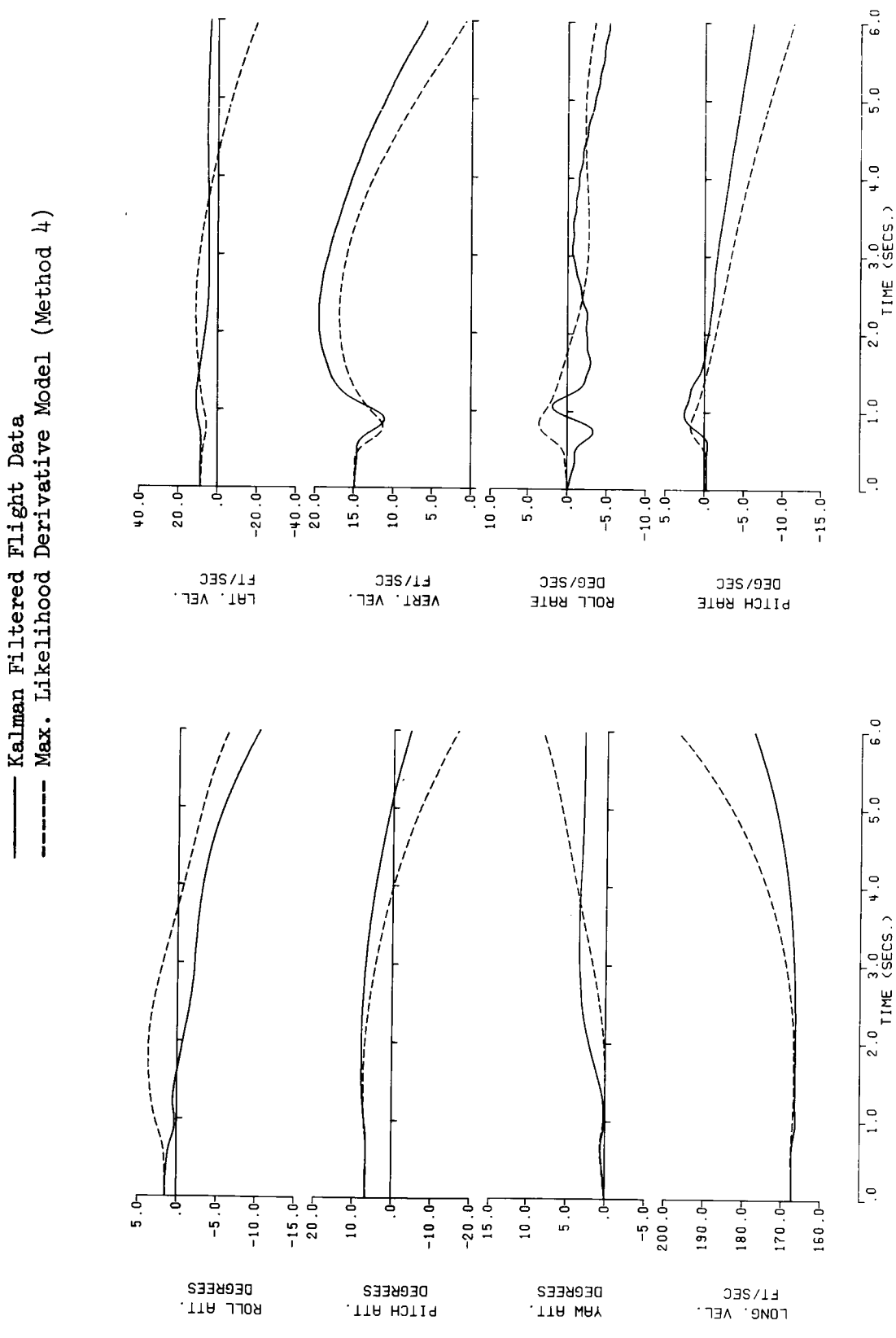
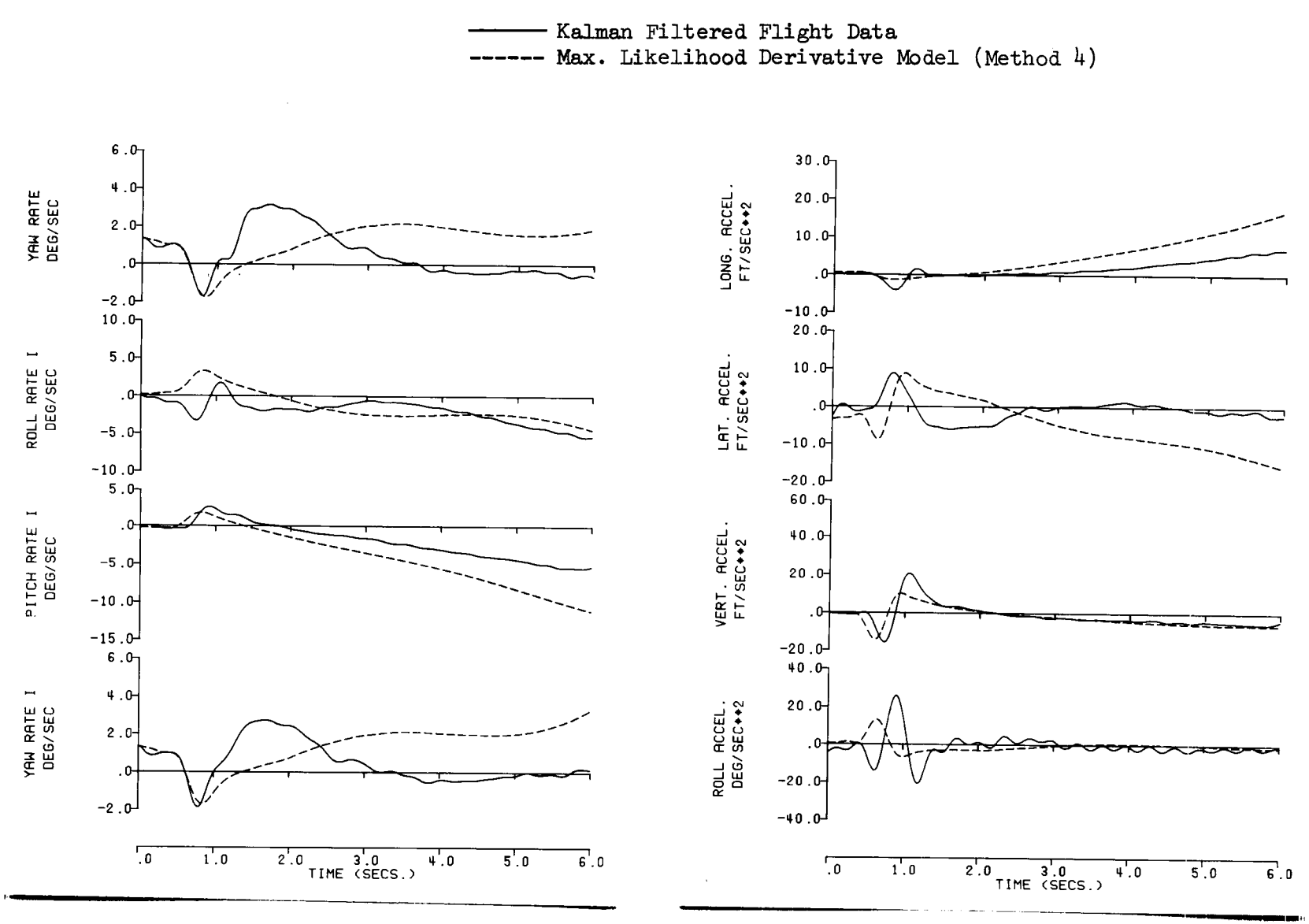


Figure 47. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 6).



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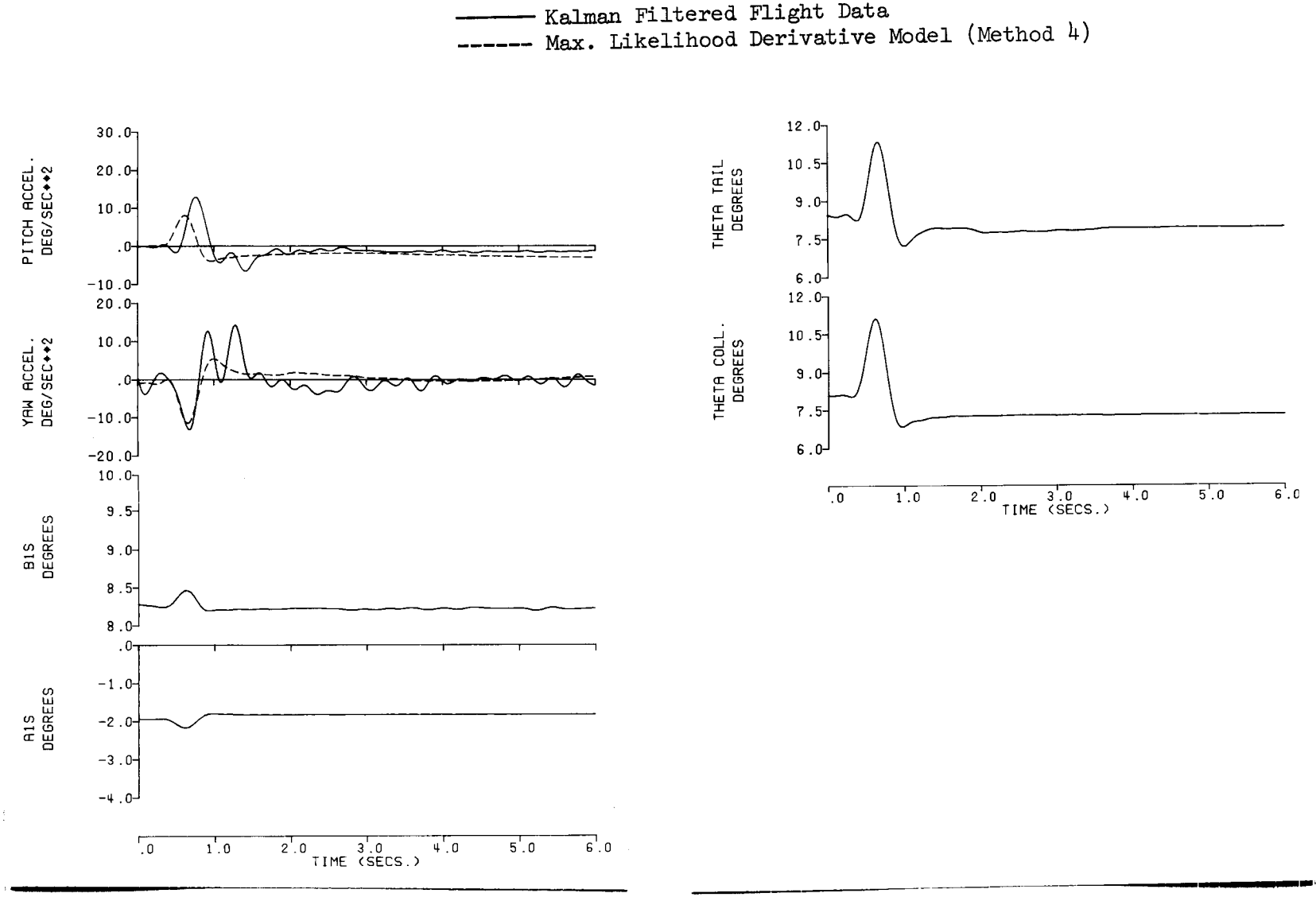

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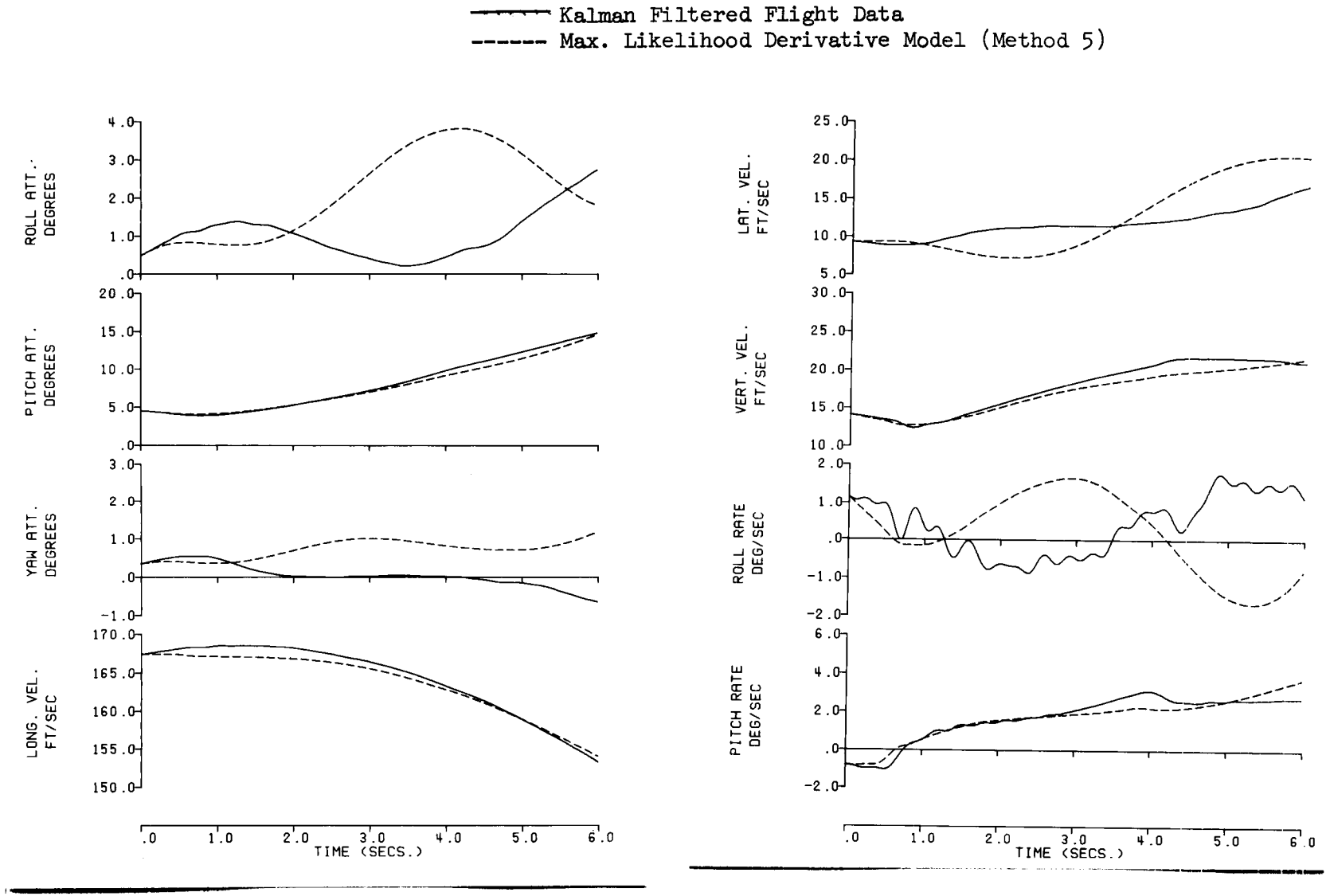
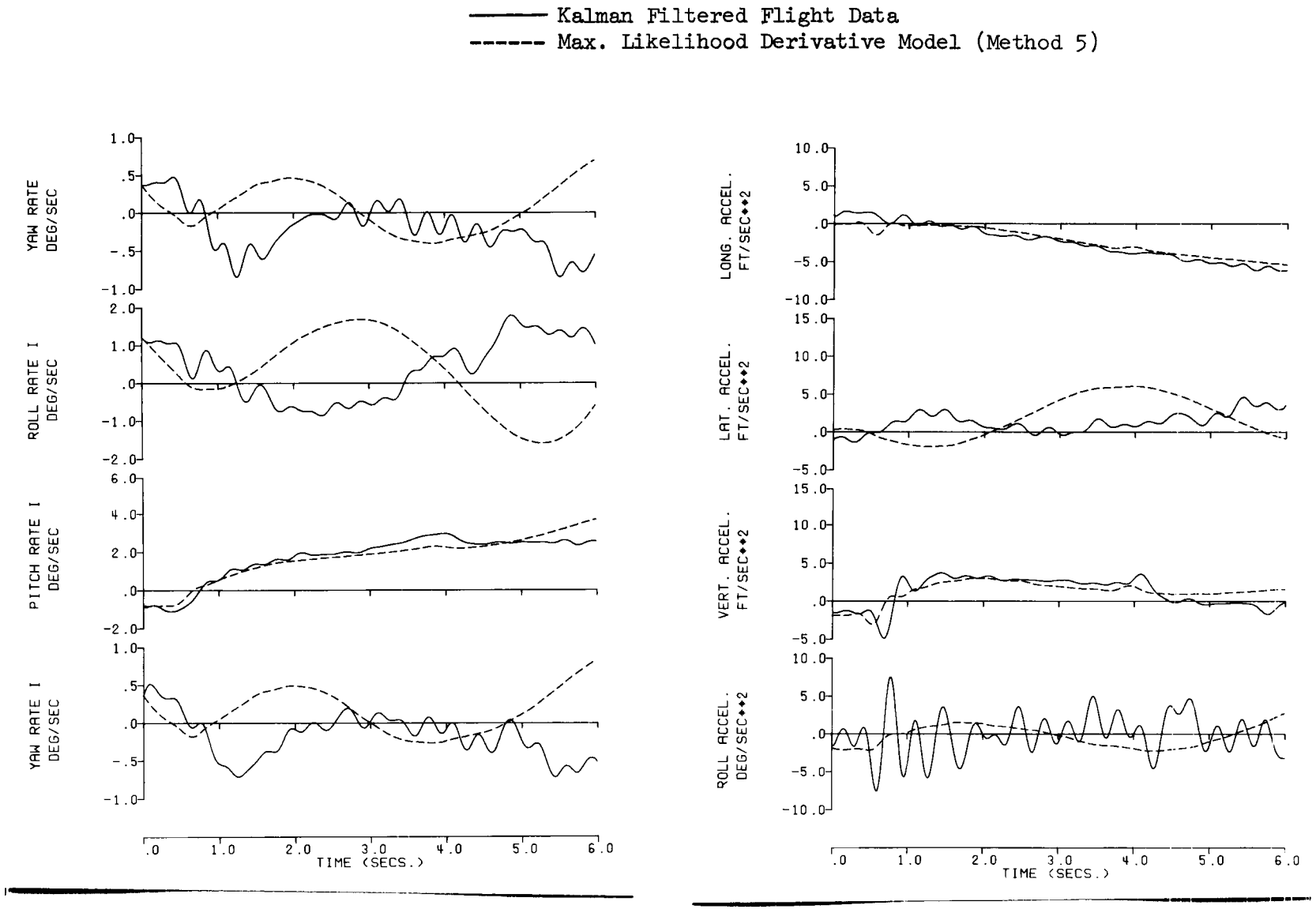


Figure 48. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 1).



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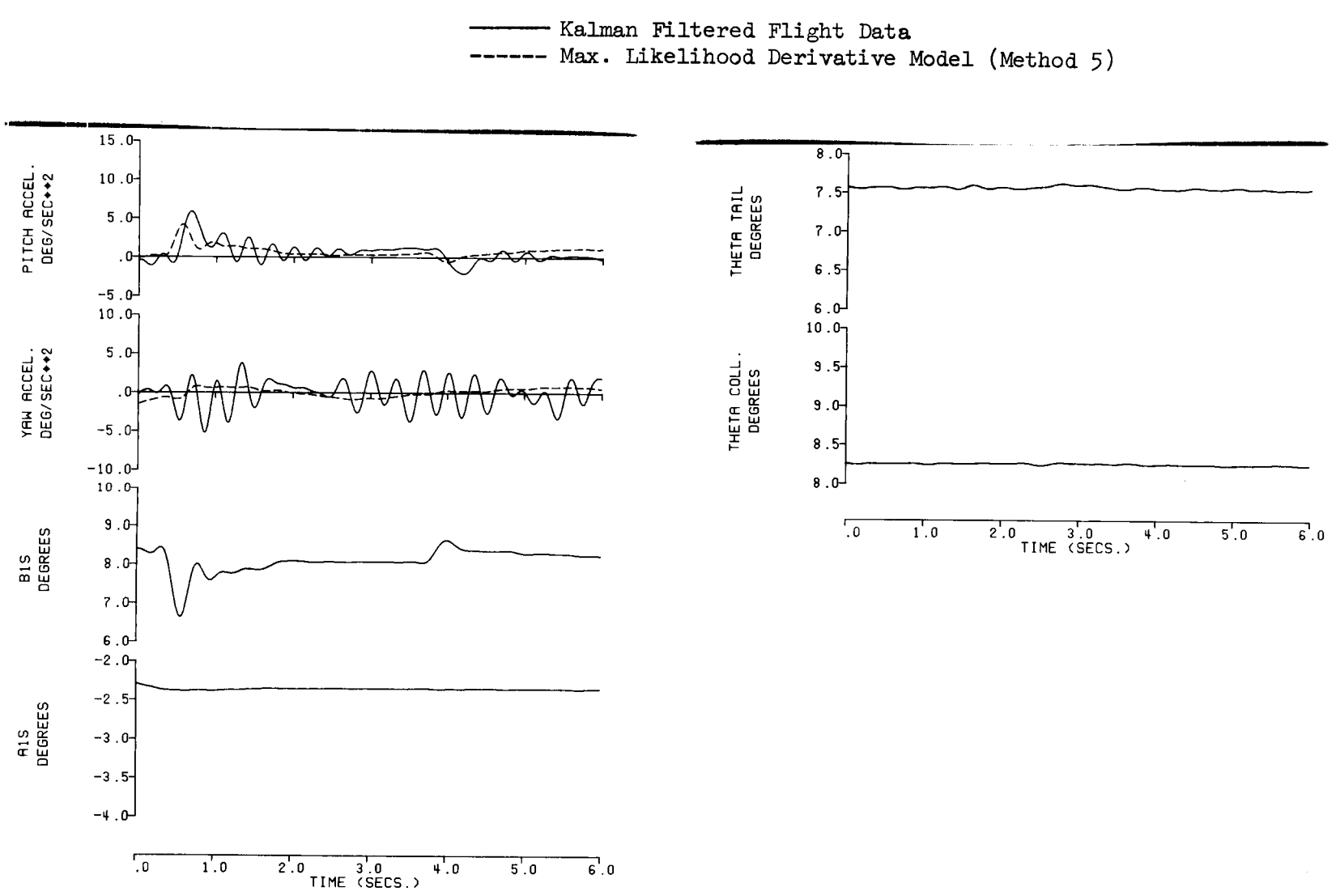

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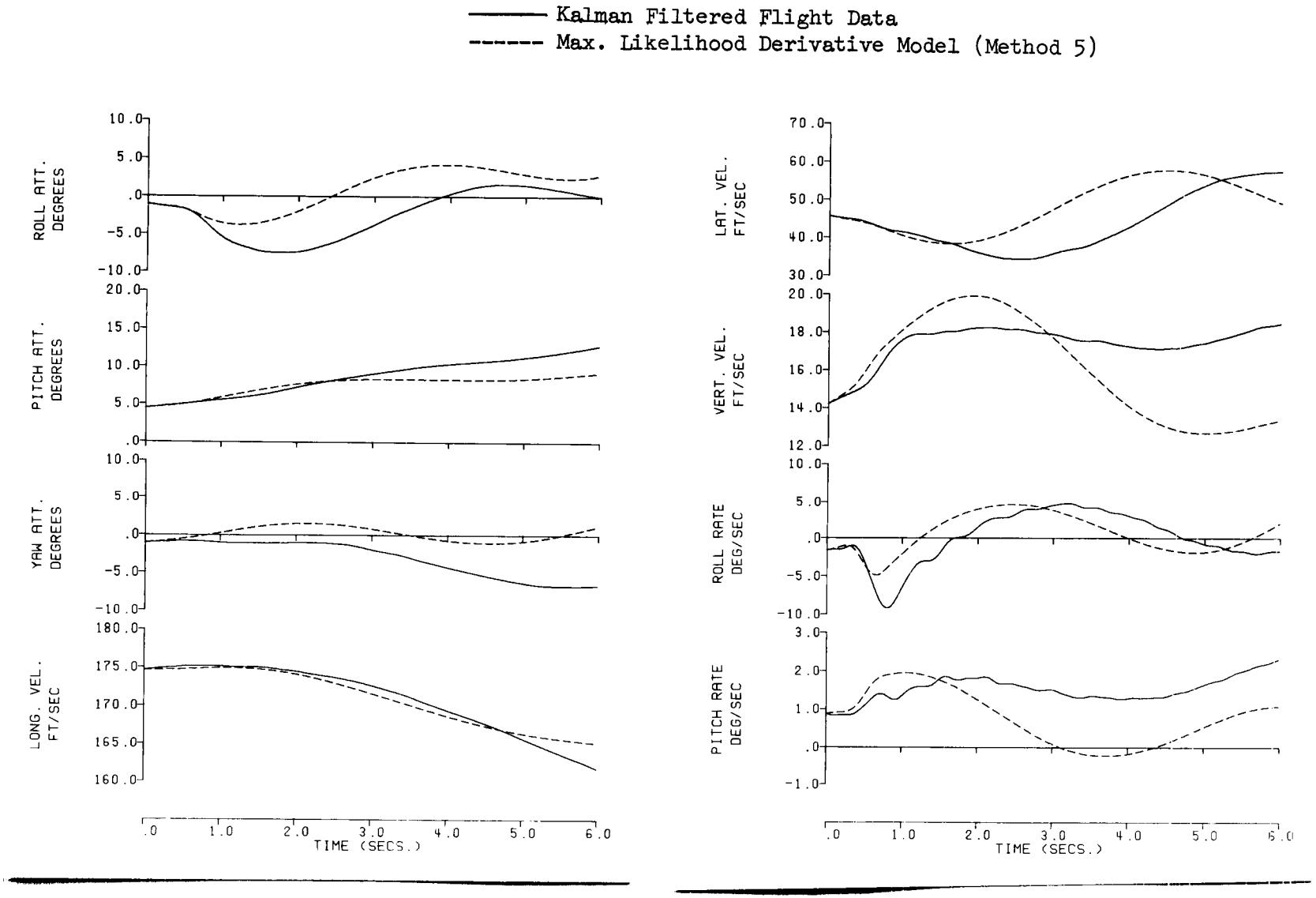
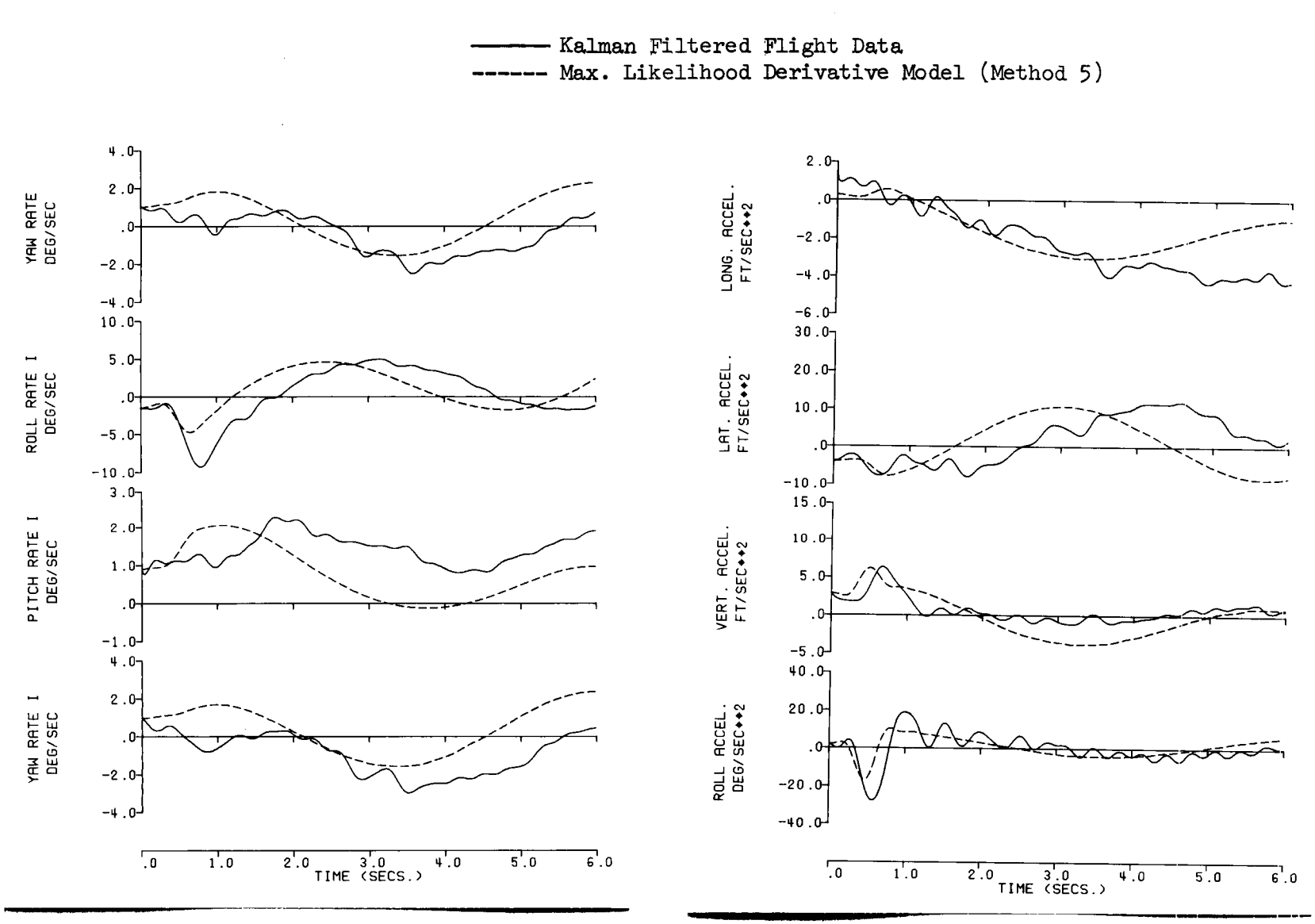


Figure 49. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 2).



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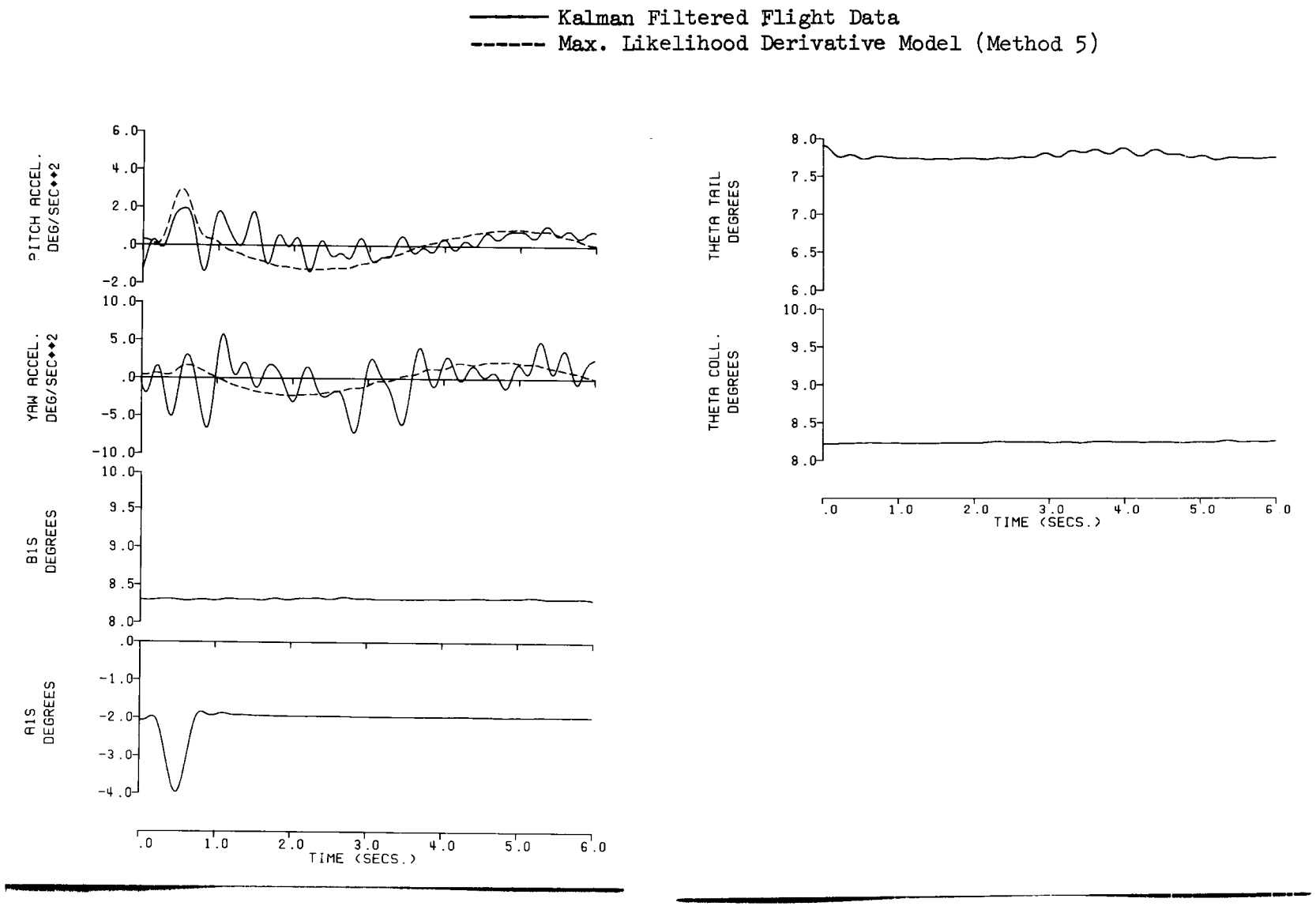

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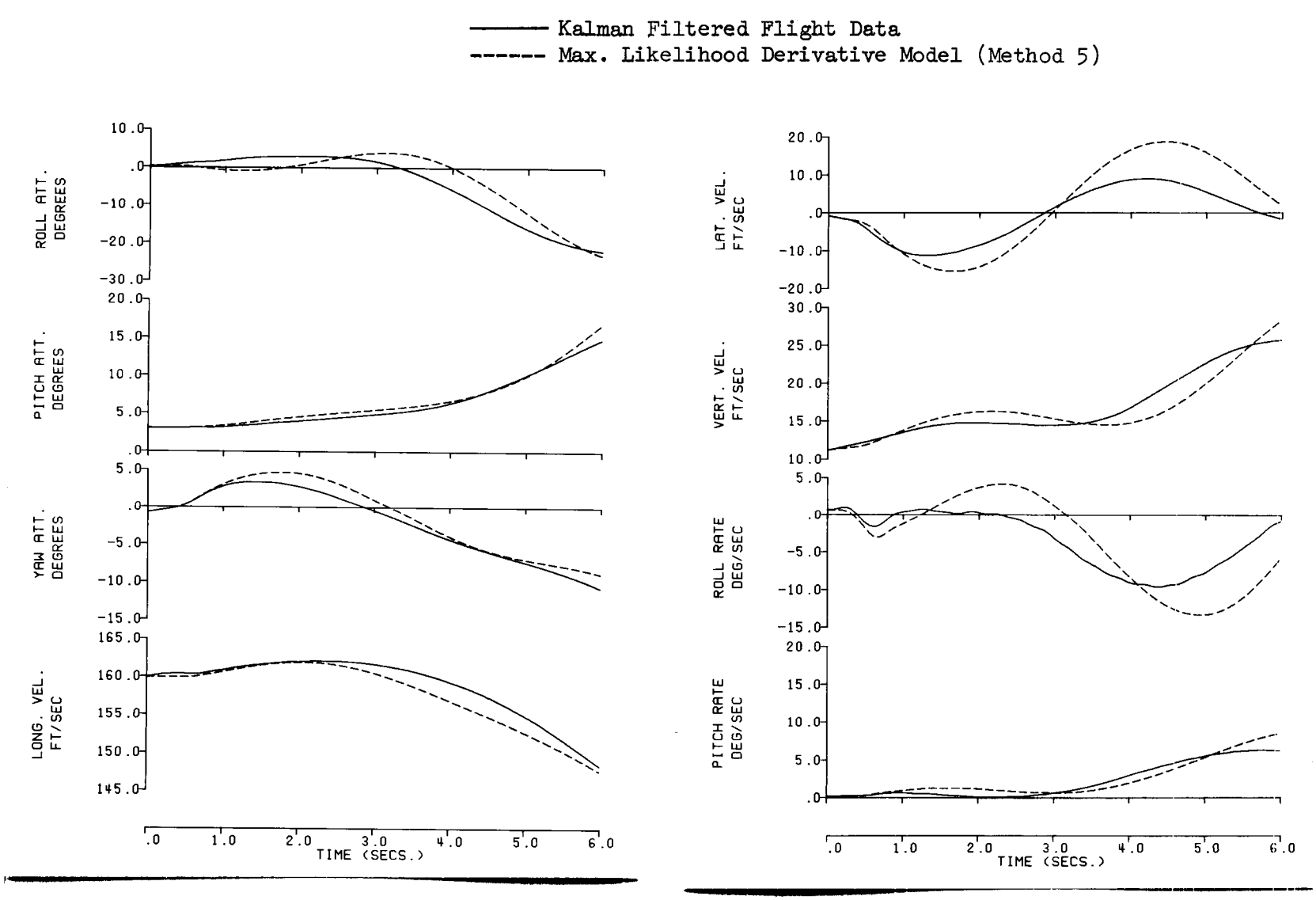
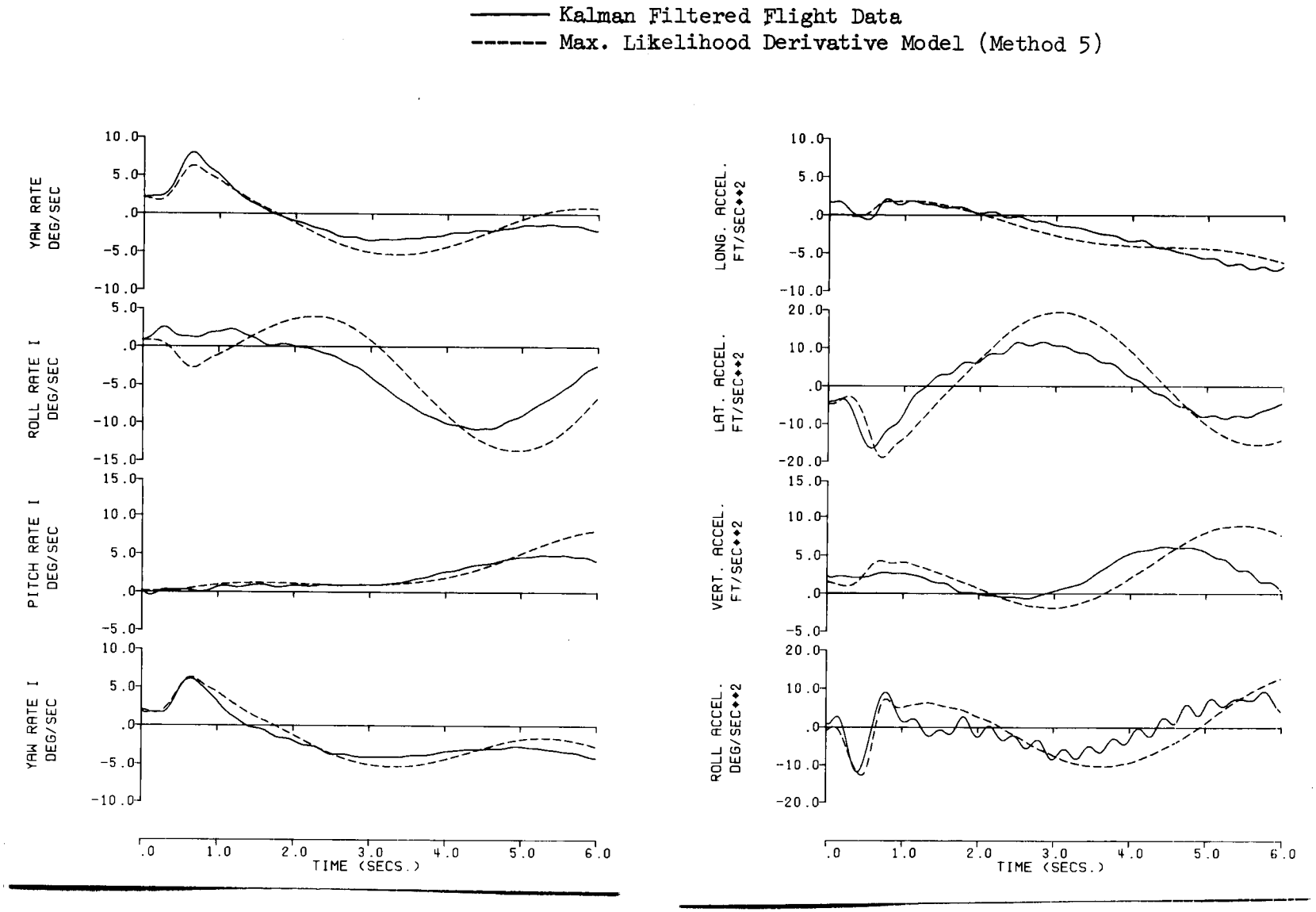


Figure 50. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 3).



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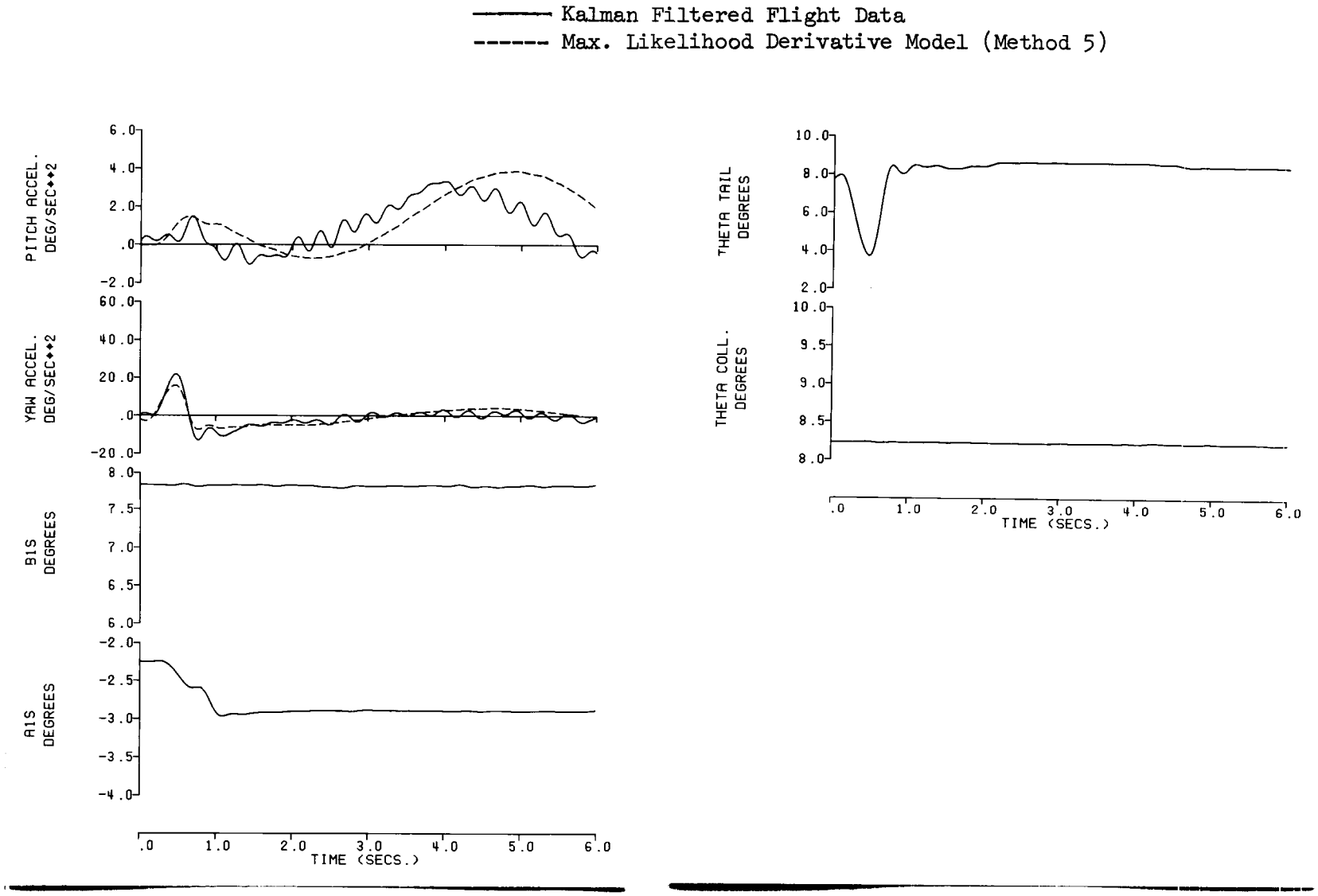

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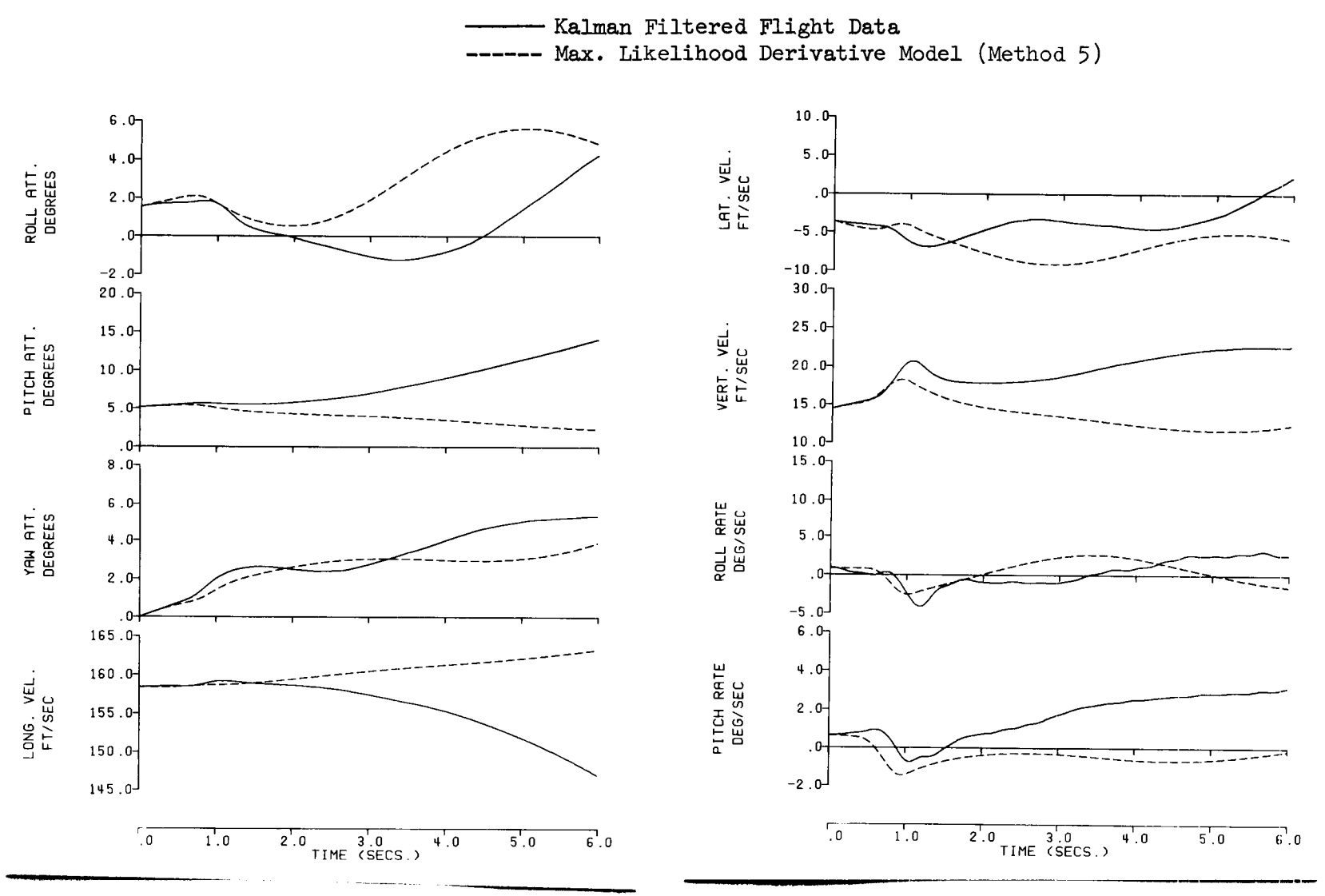
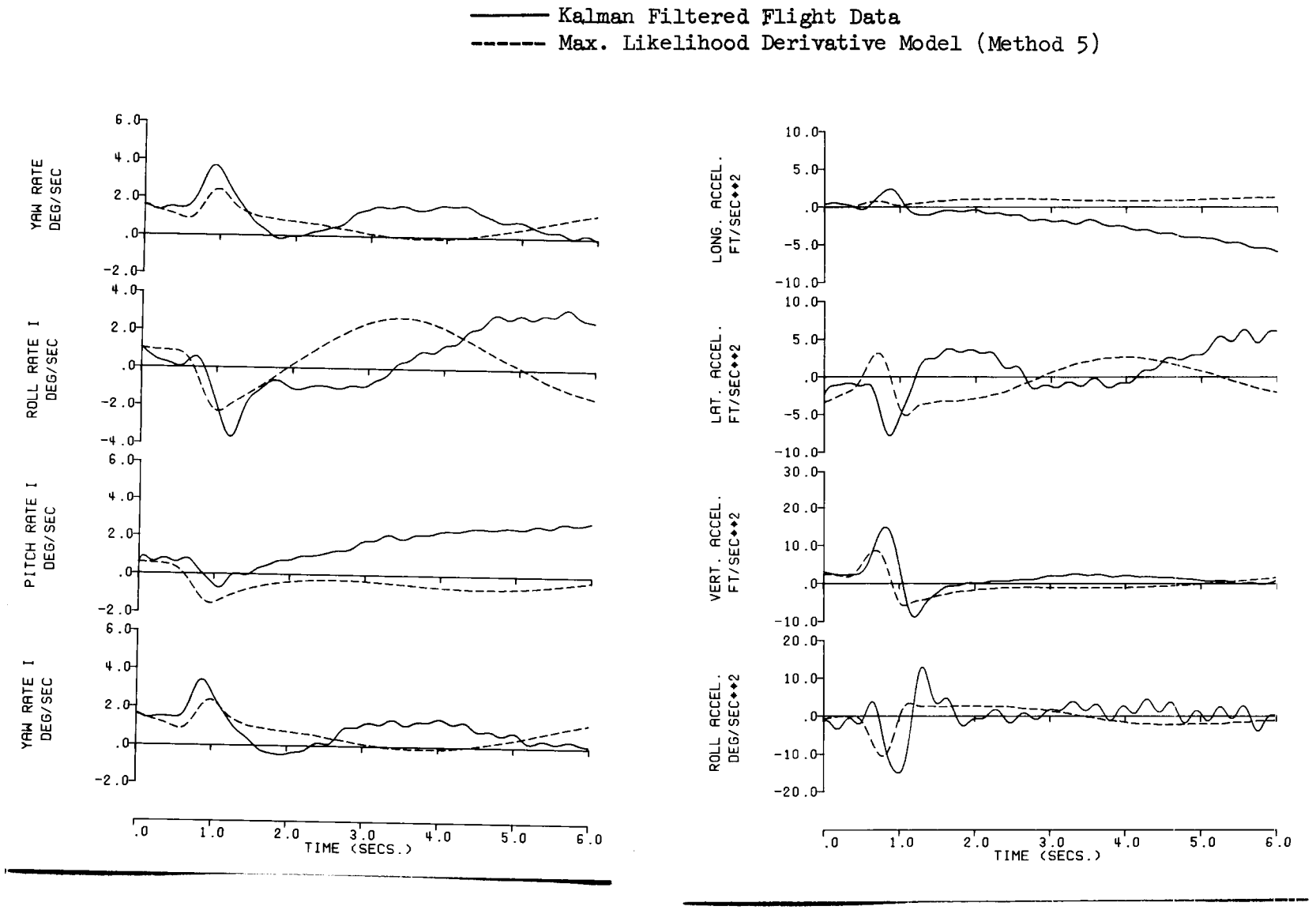


Figure 51. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 4).



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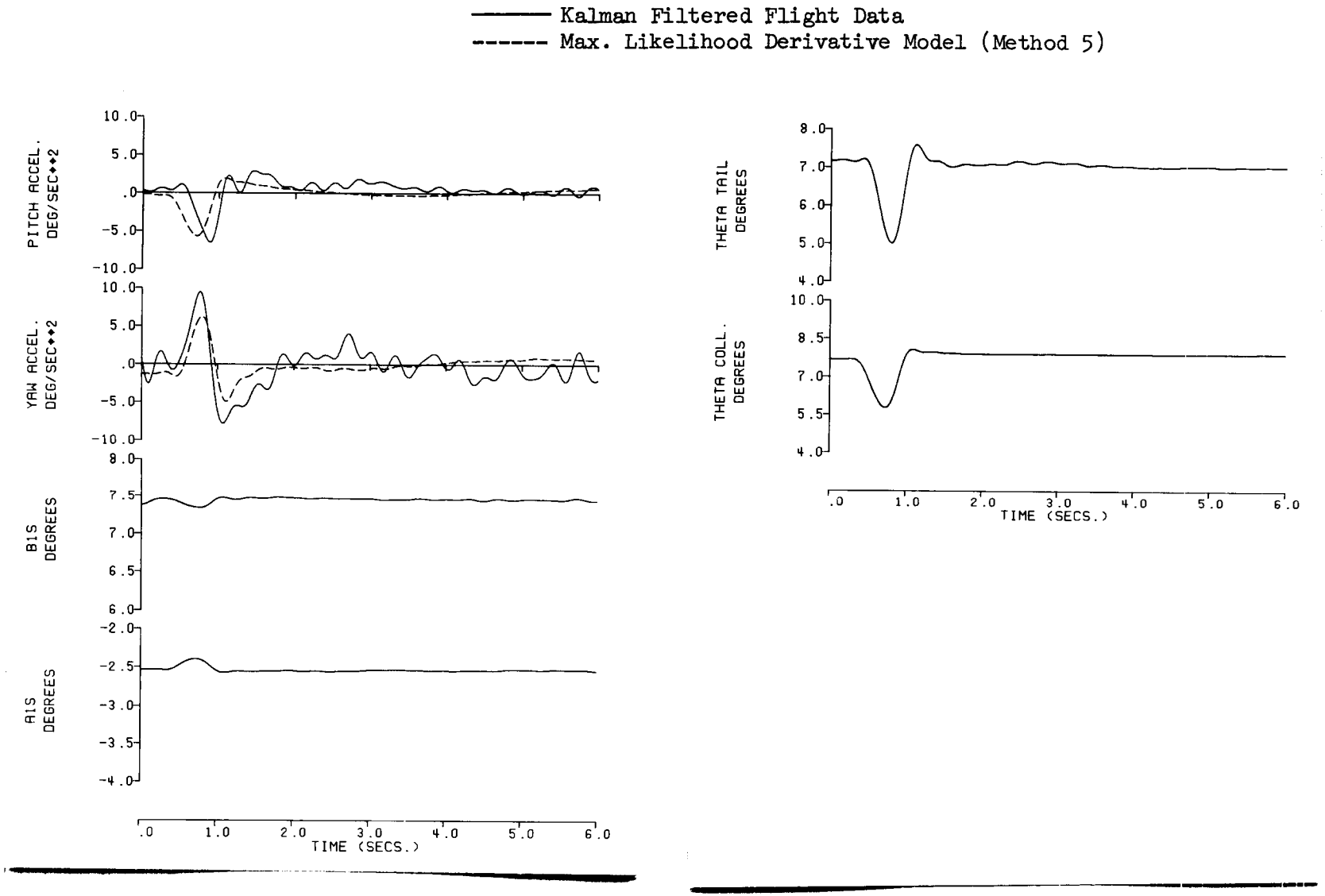

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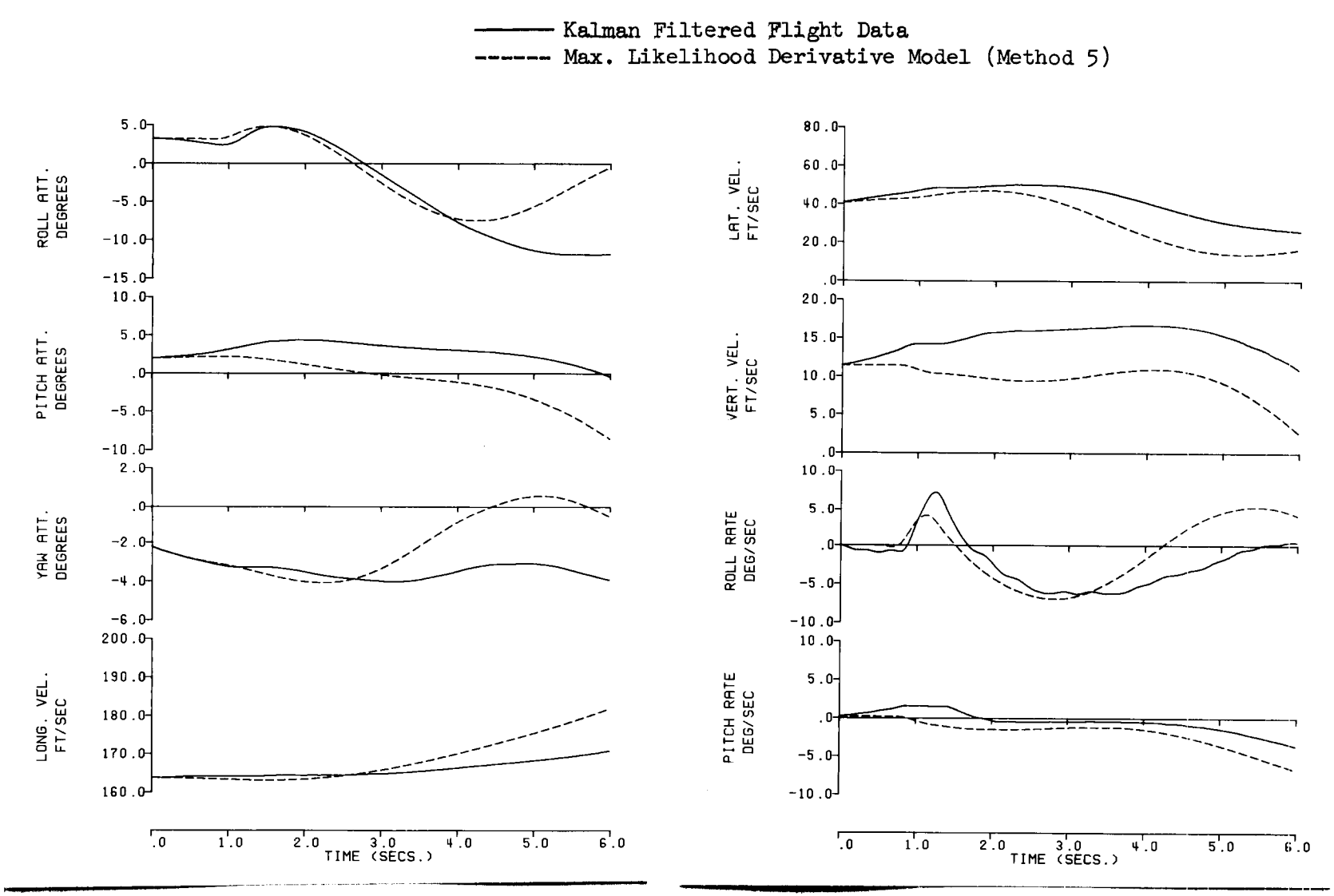
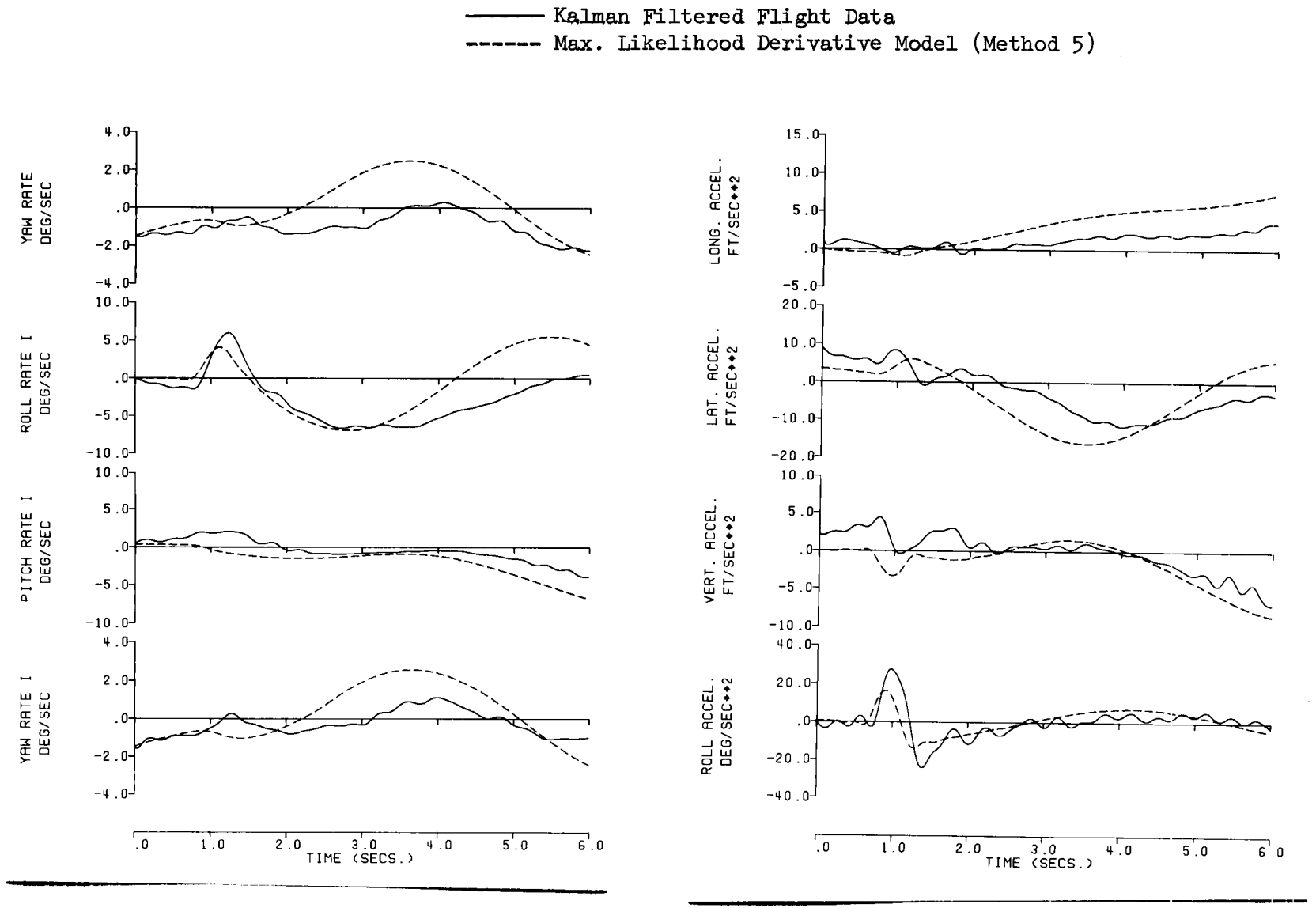


Figure 52. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 5).



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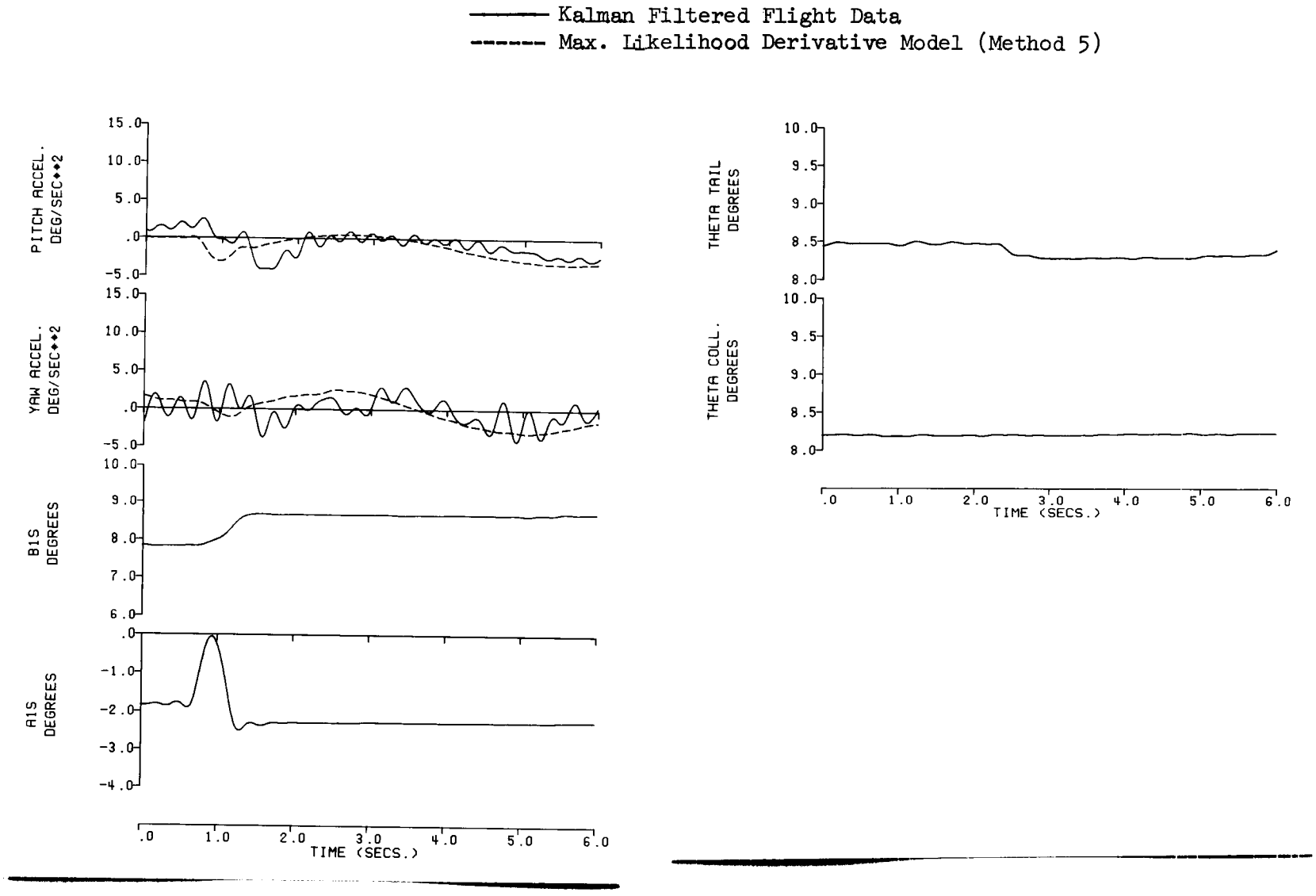

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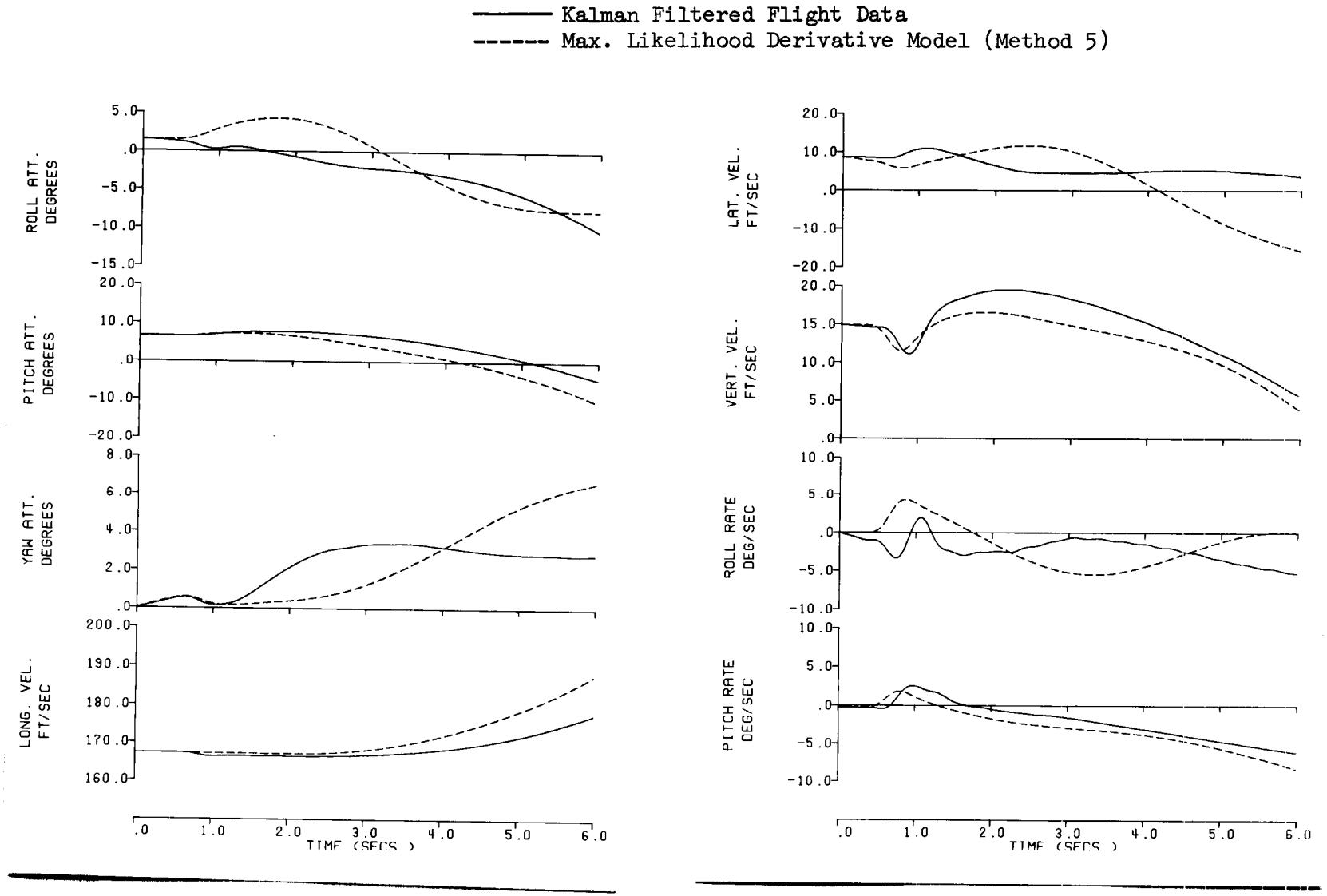


Figure 53. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 6).

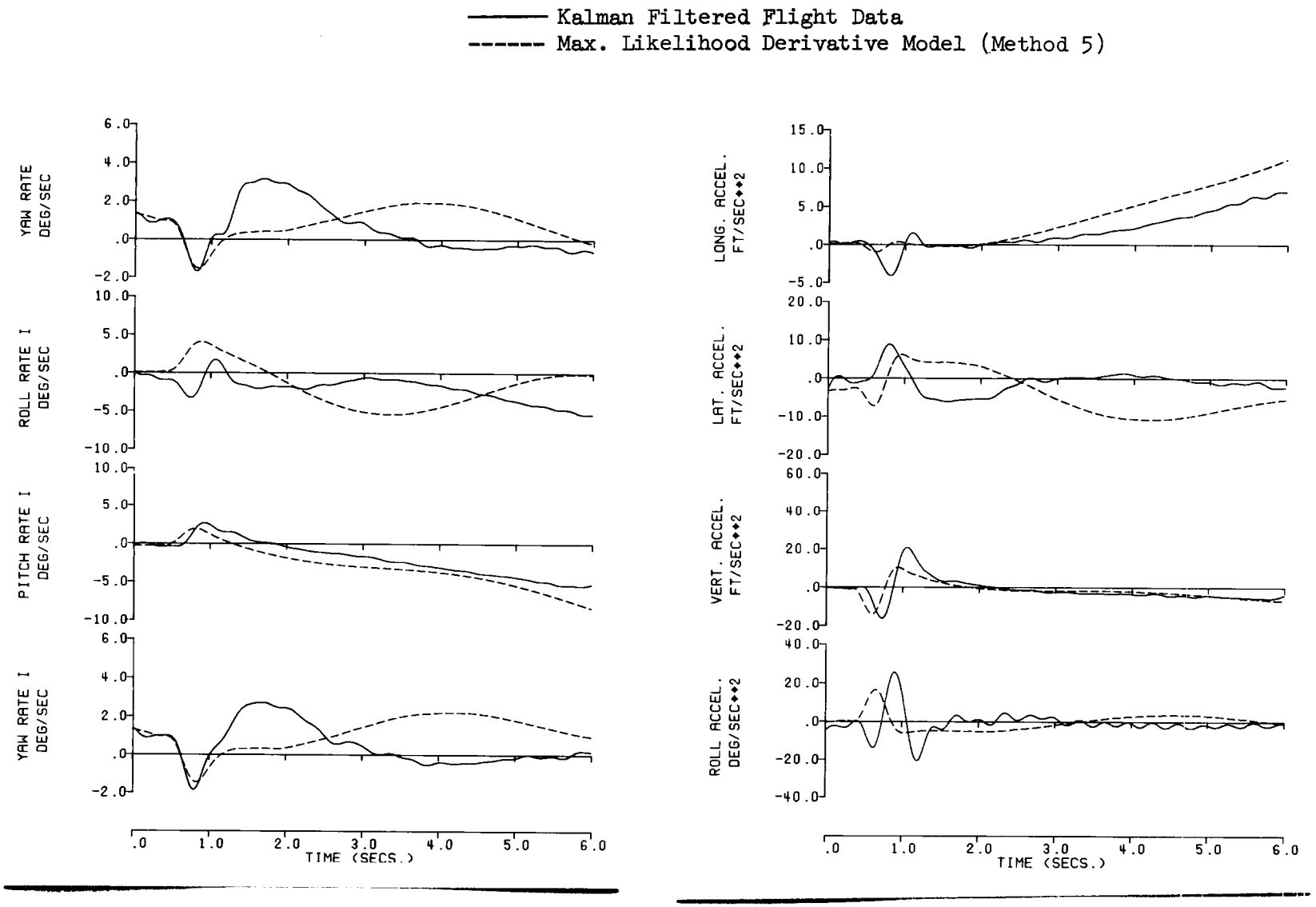
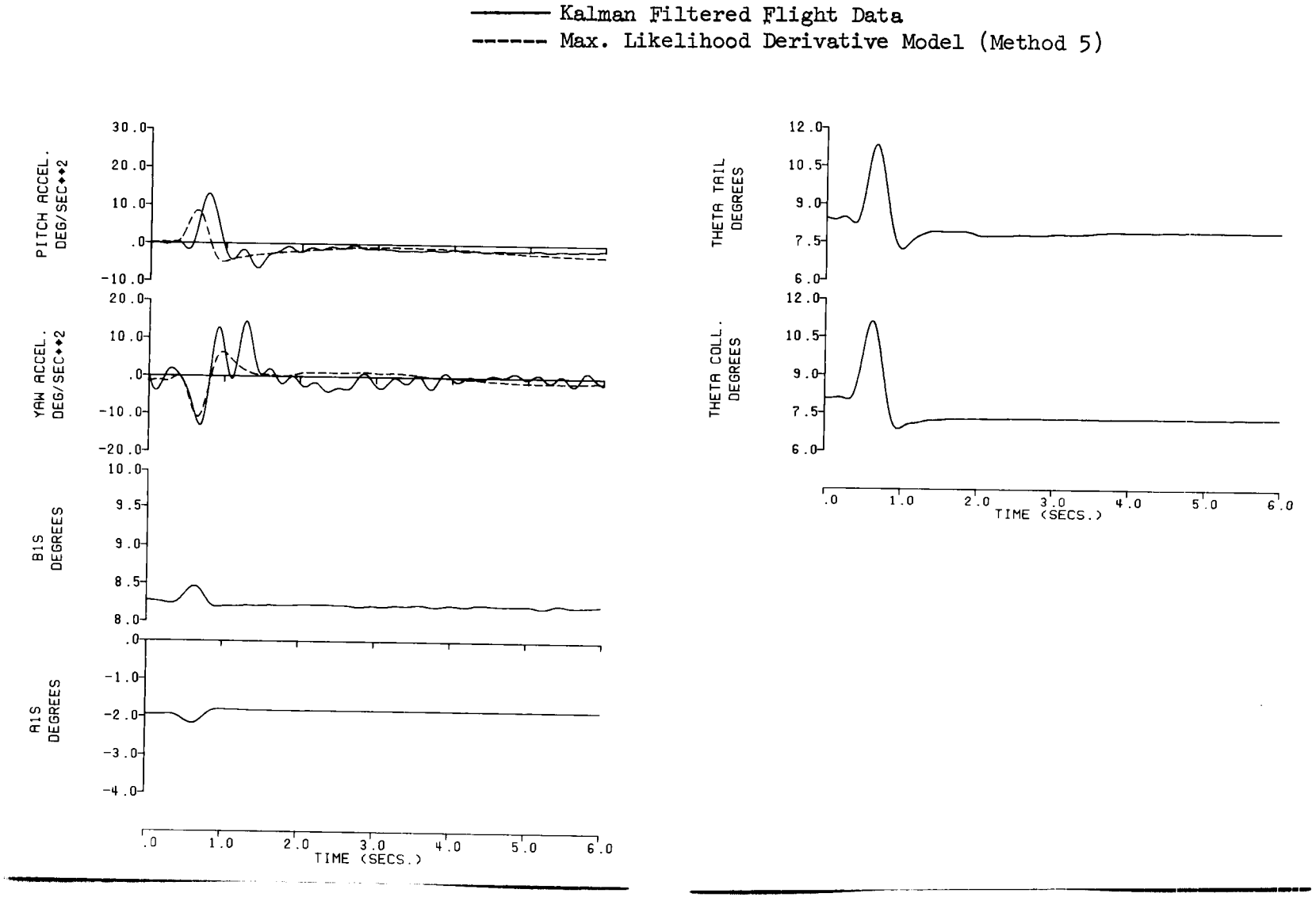


Figure 53. - Continued.



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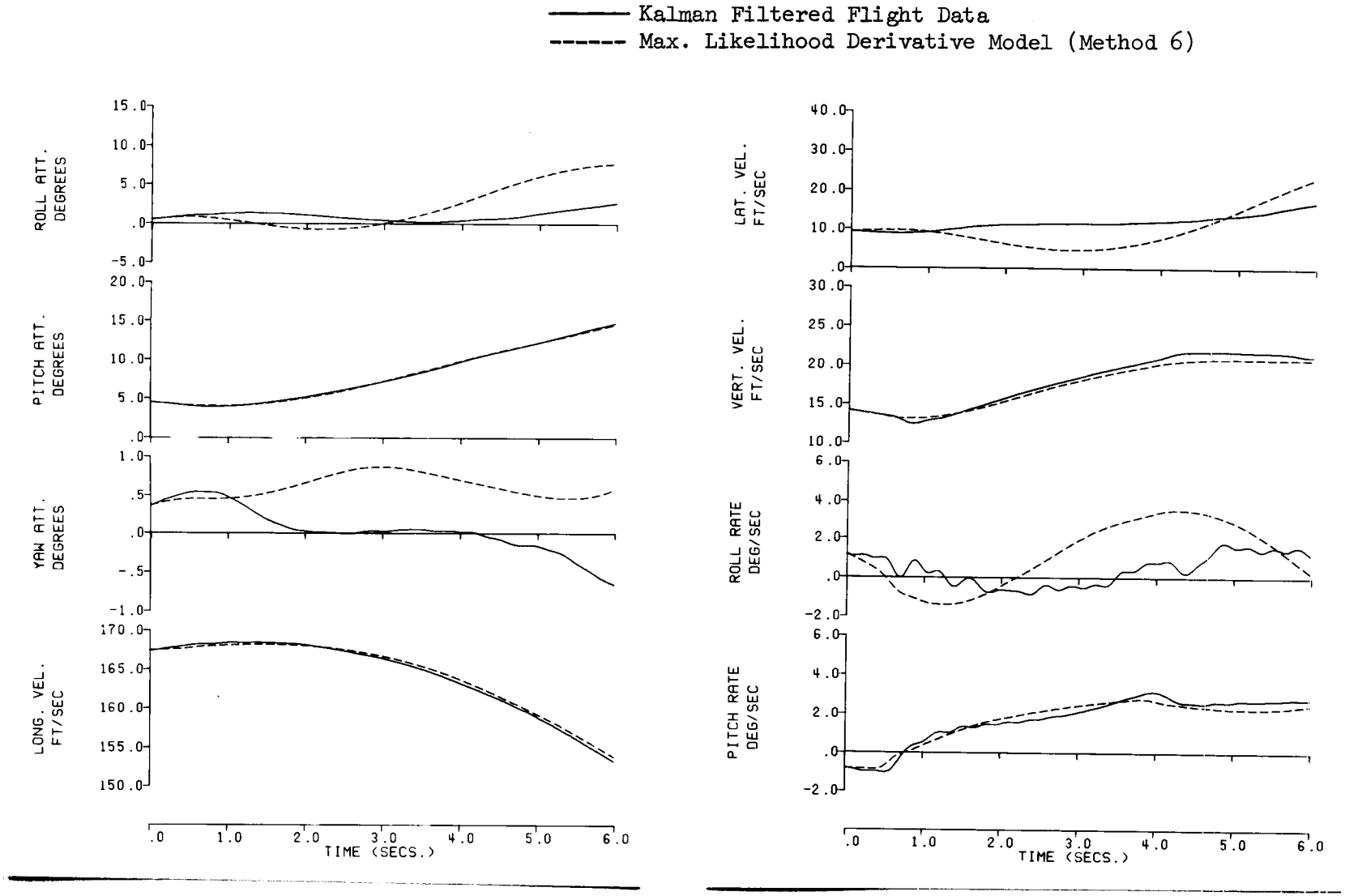


Figure 54. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 1).

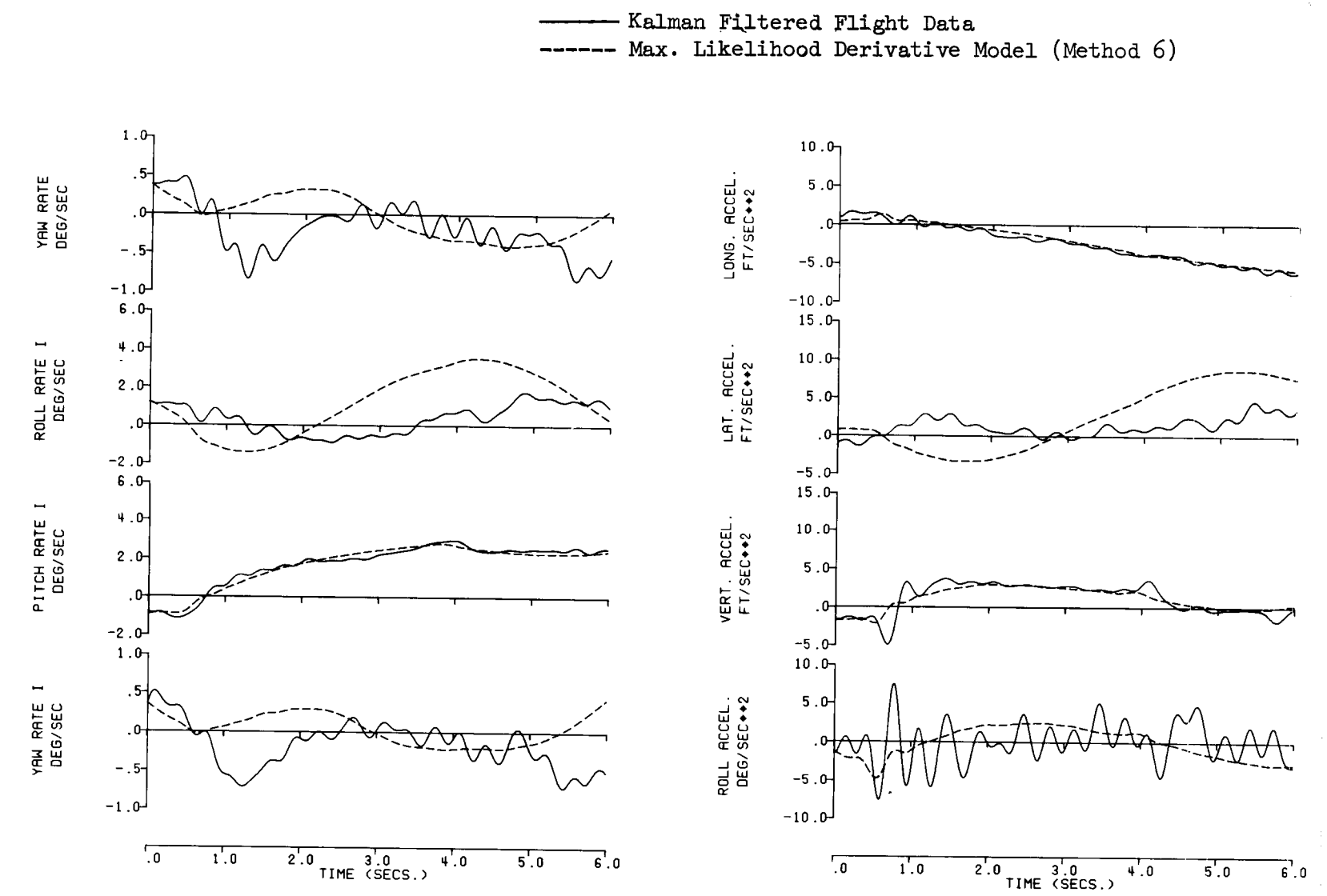
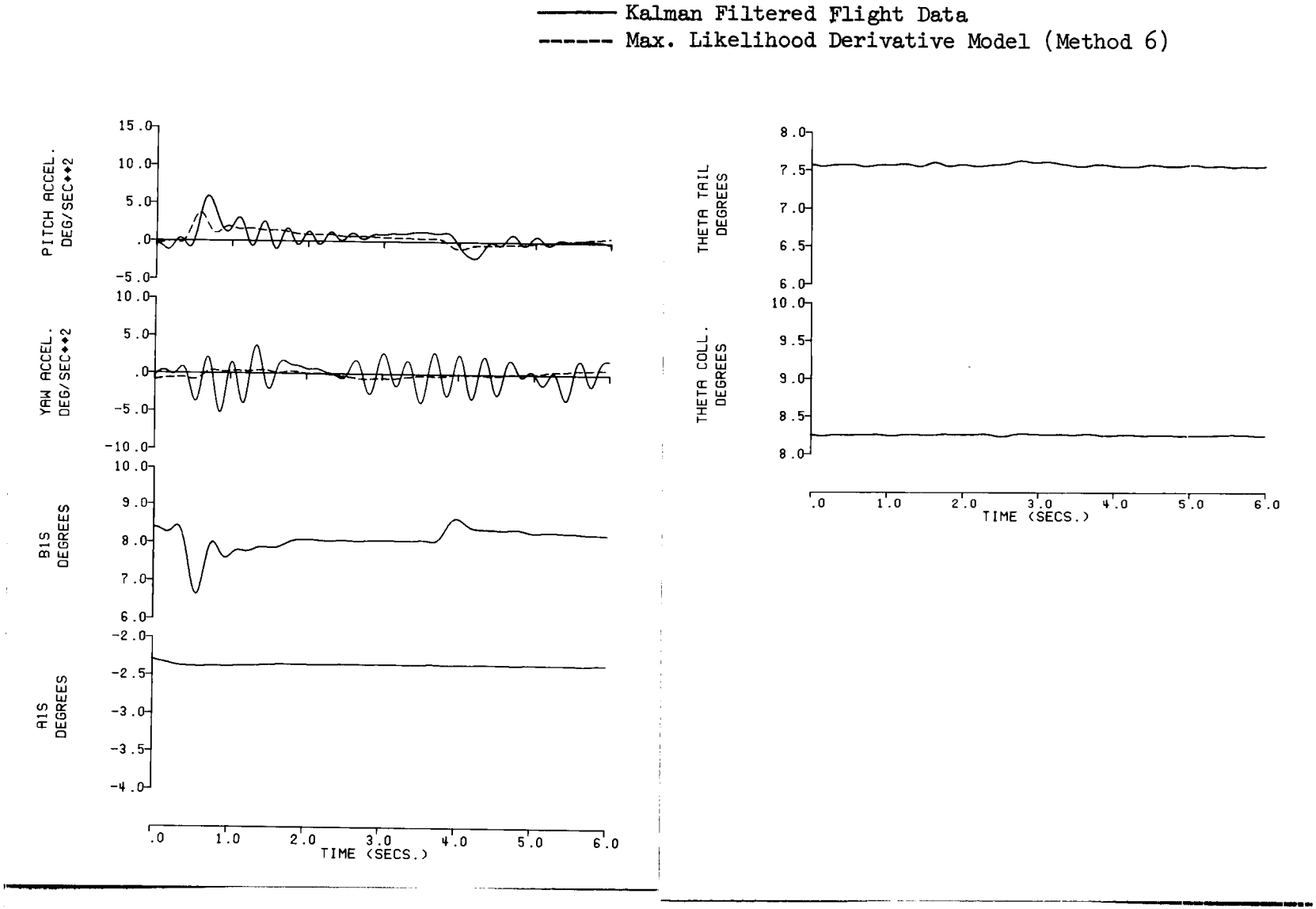


Figure 54. - Continued.



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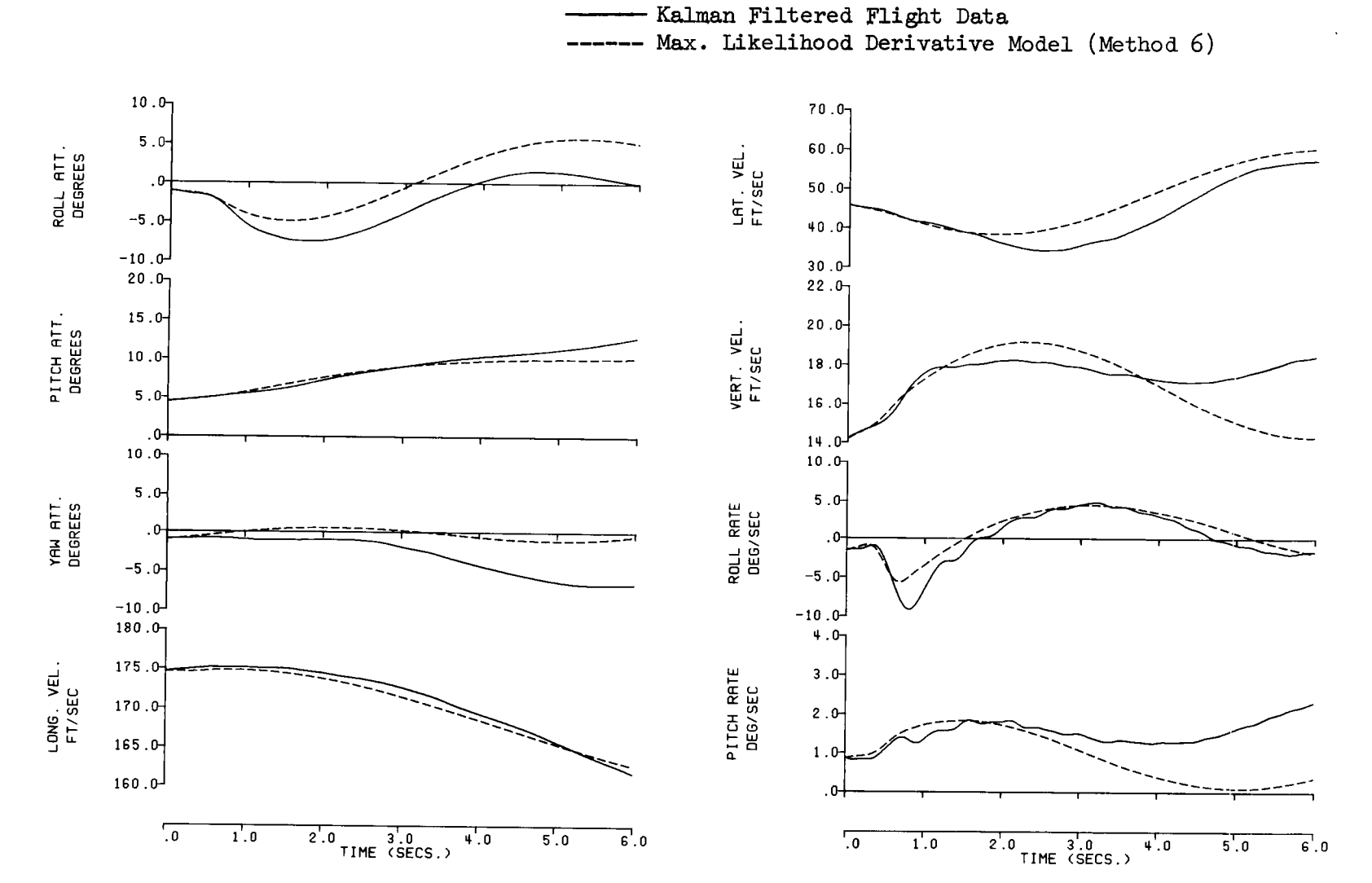


Figure 55. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 2).

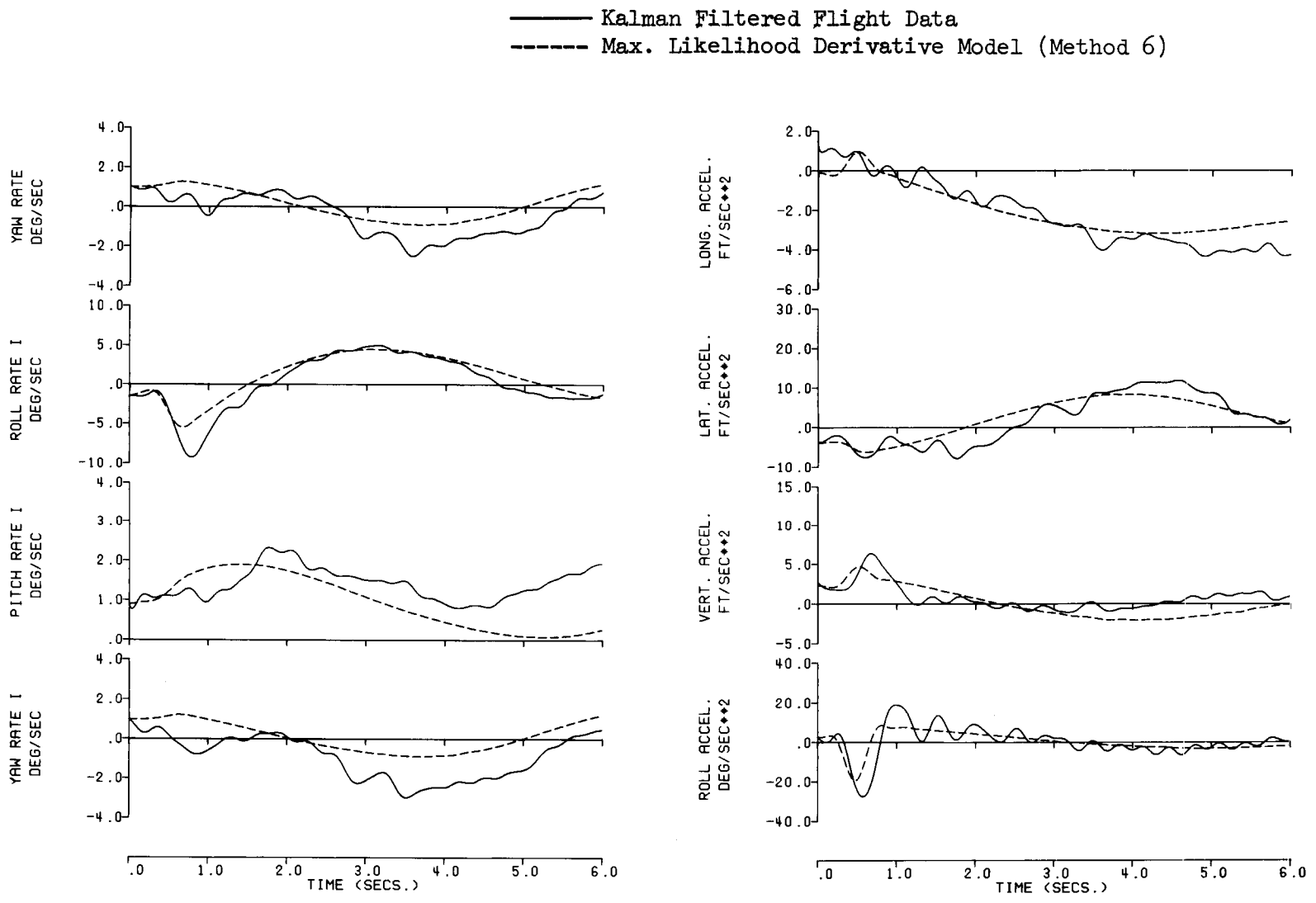
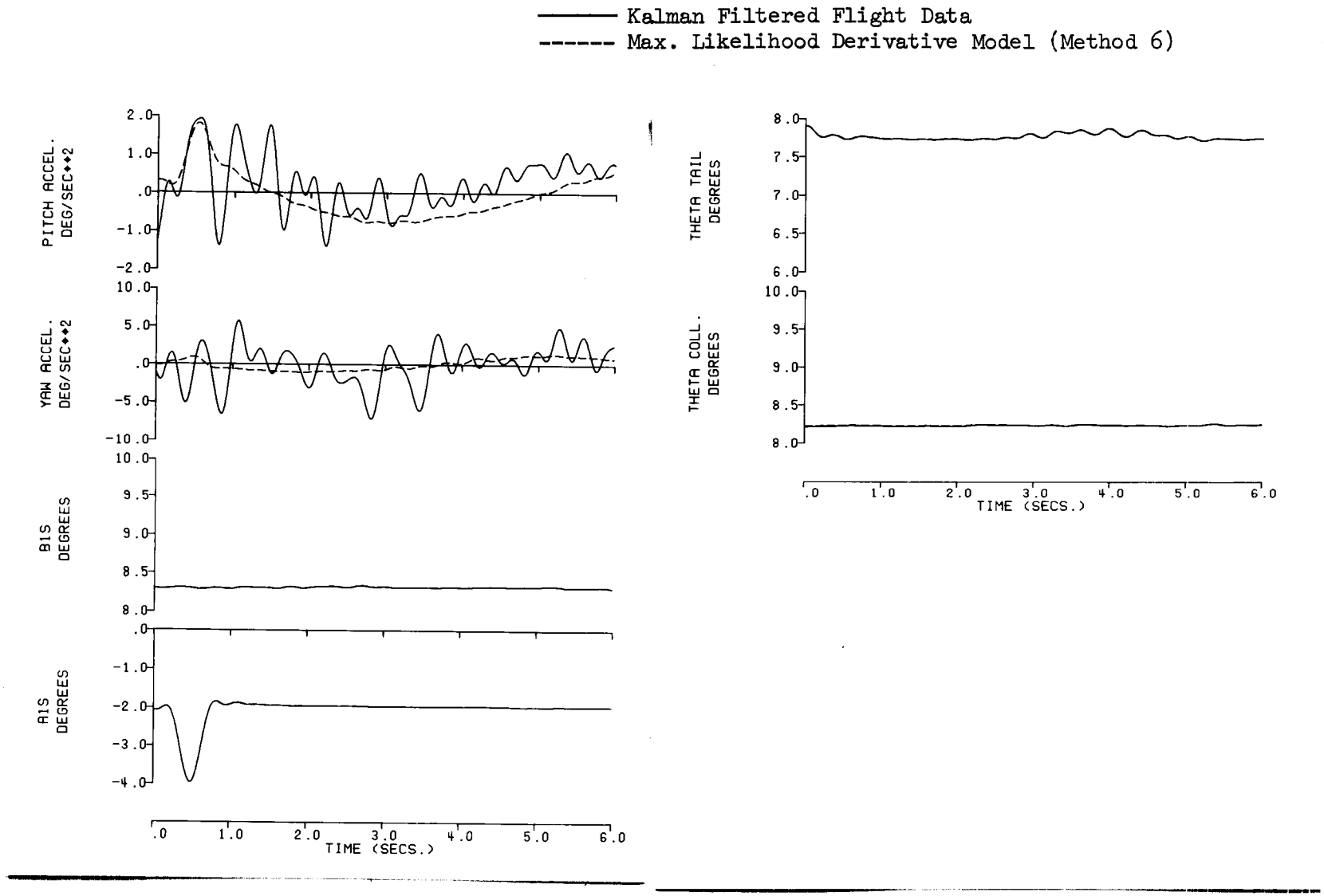


Figure 55. - Continued.



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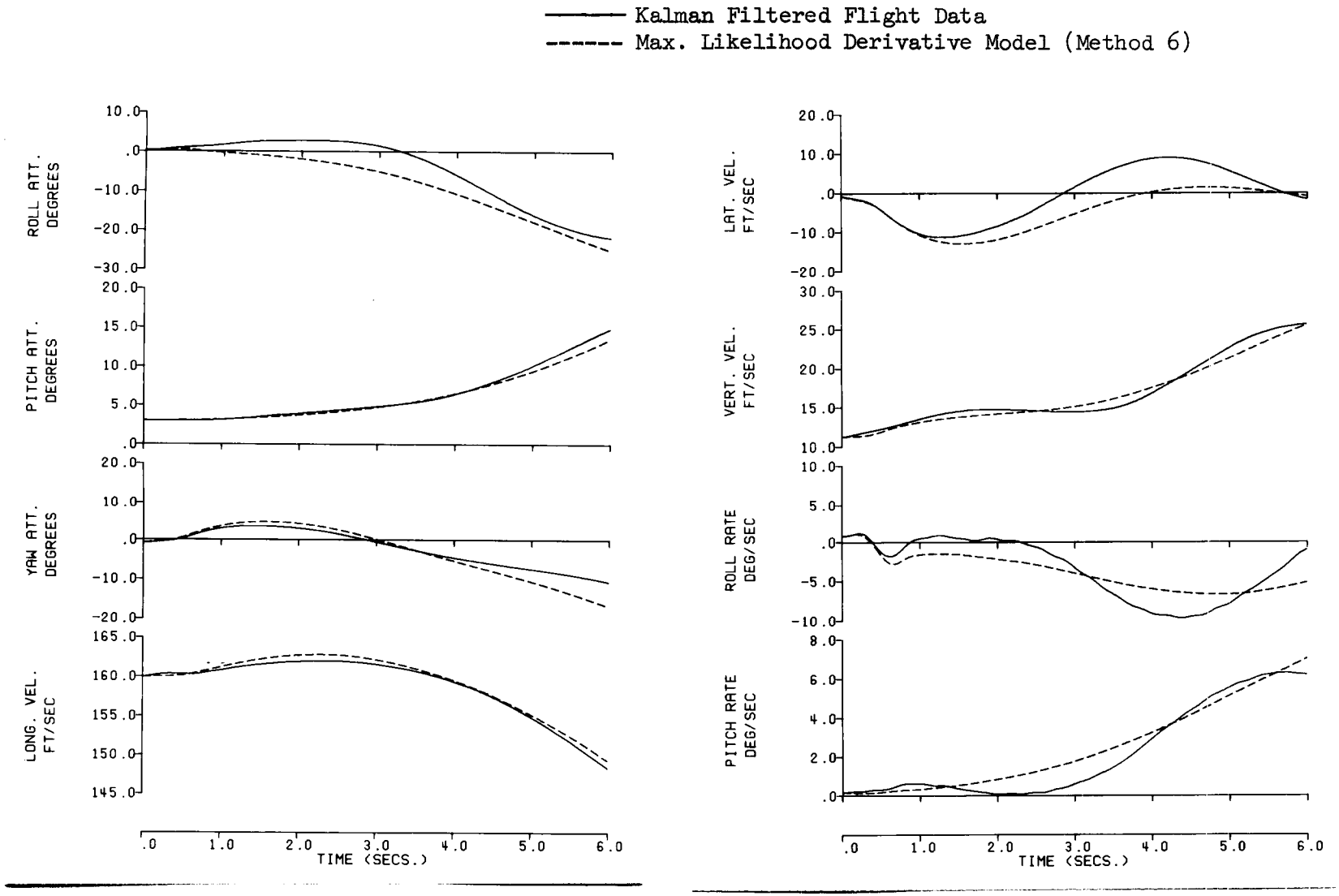


Figure 56. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 3).

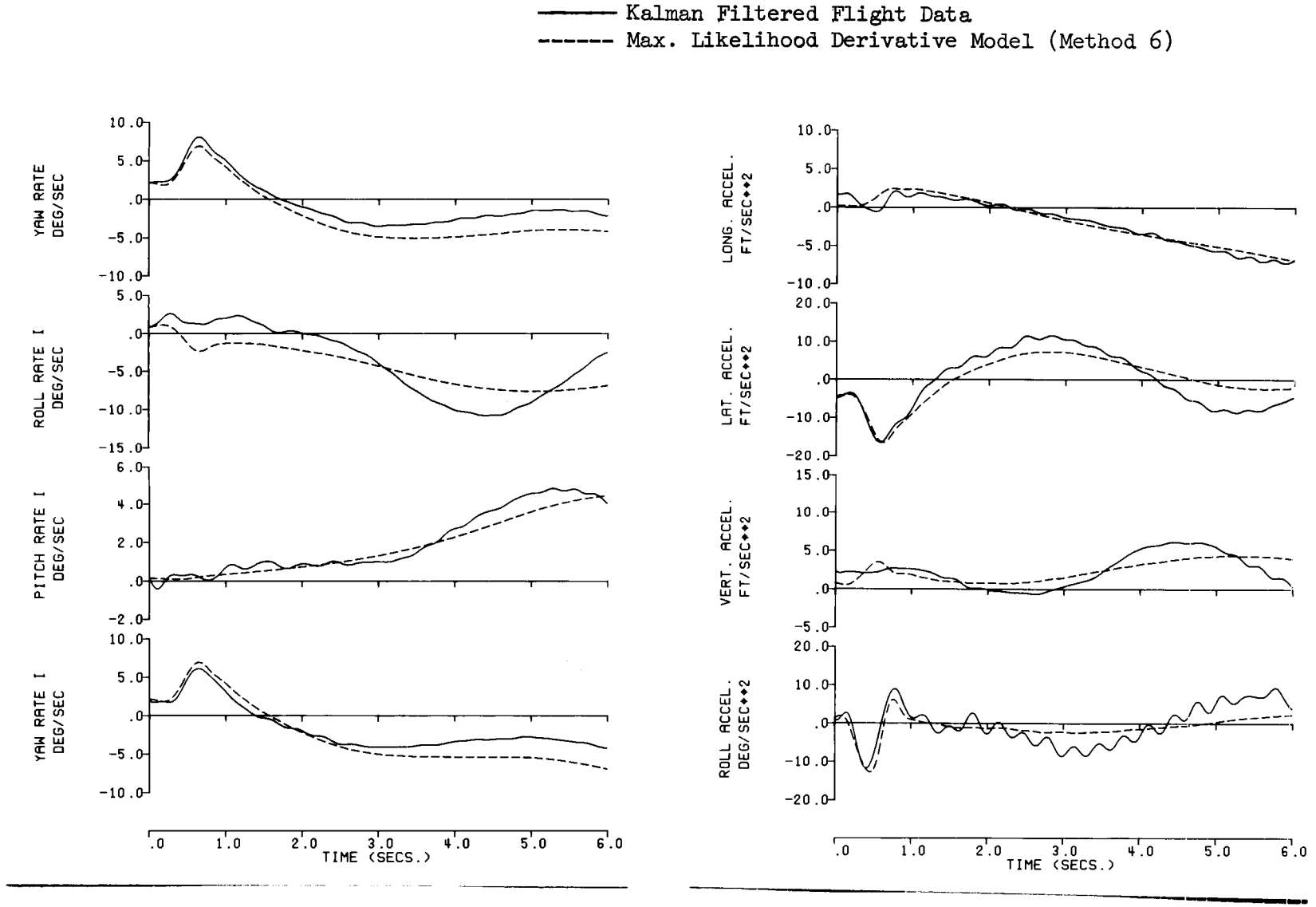


Figure 56. - Continued.

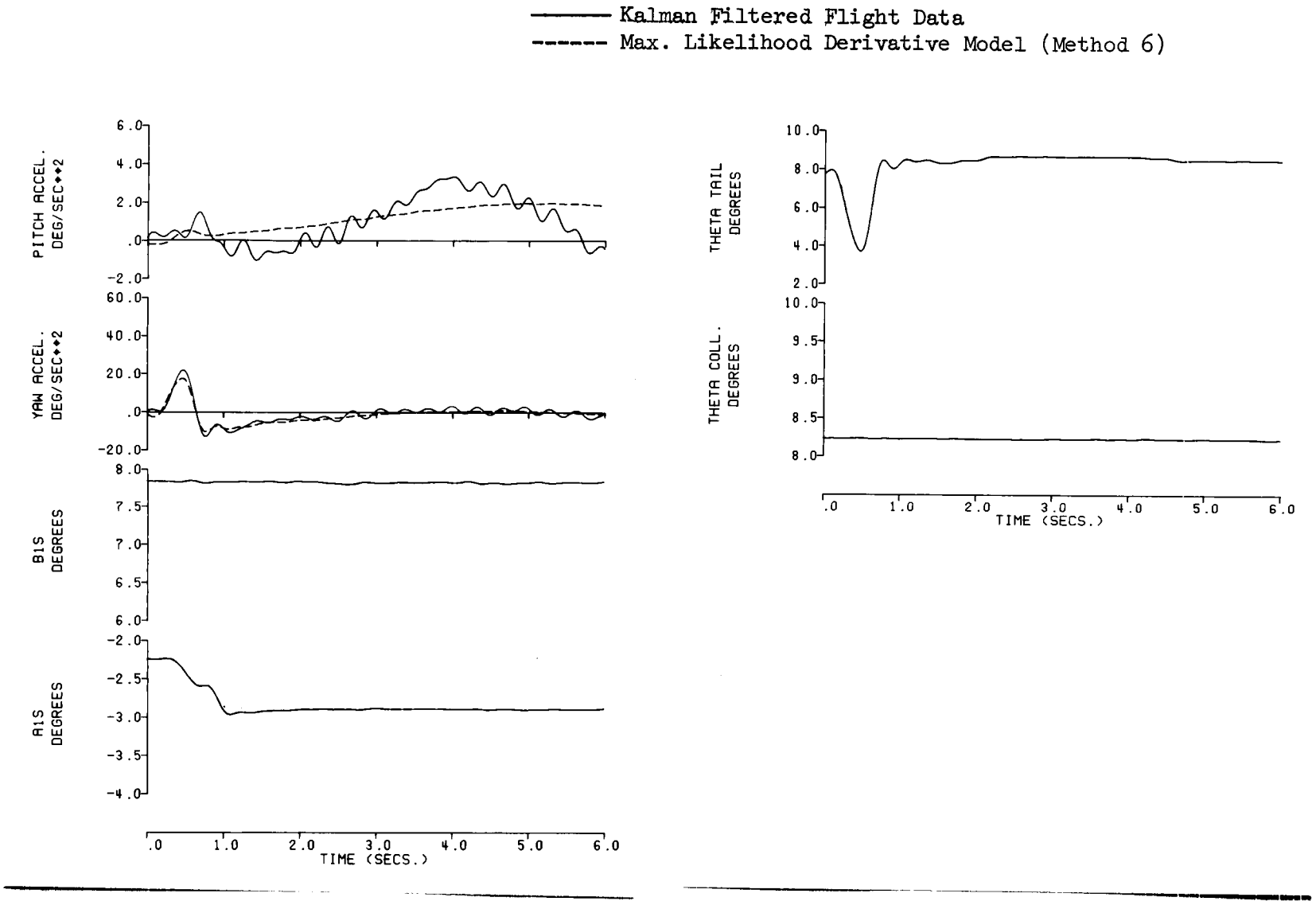


Figure 56 - Concluded.

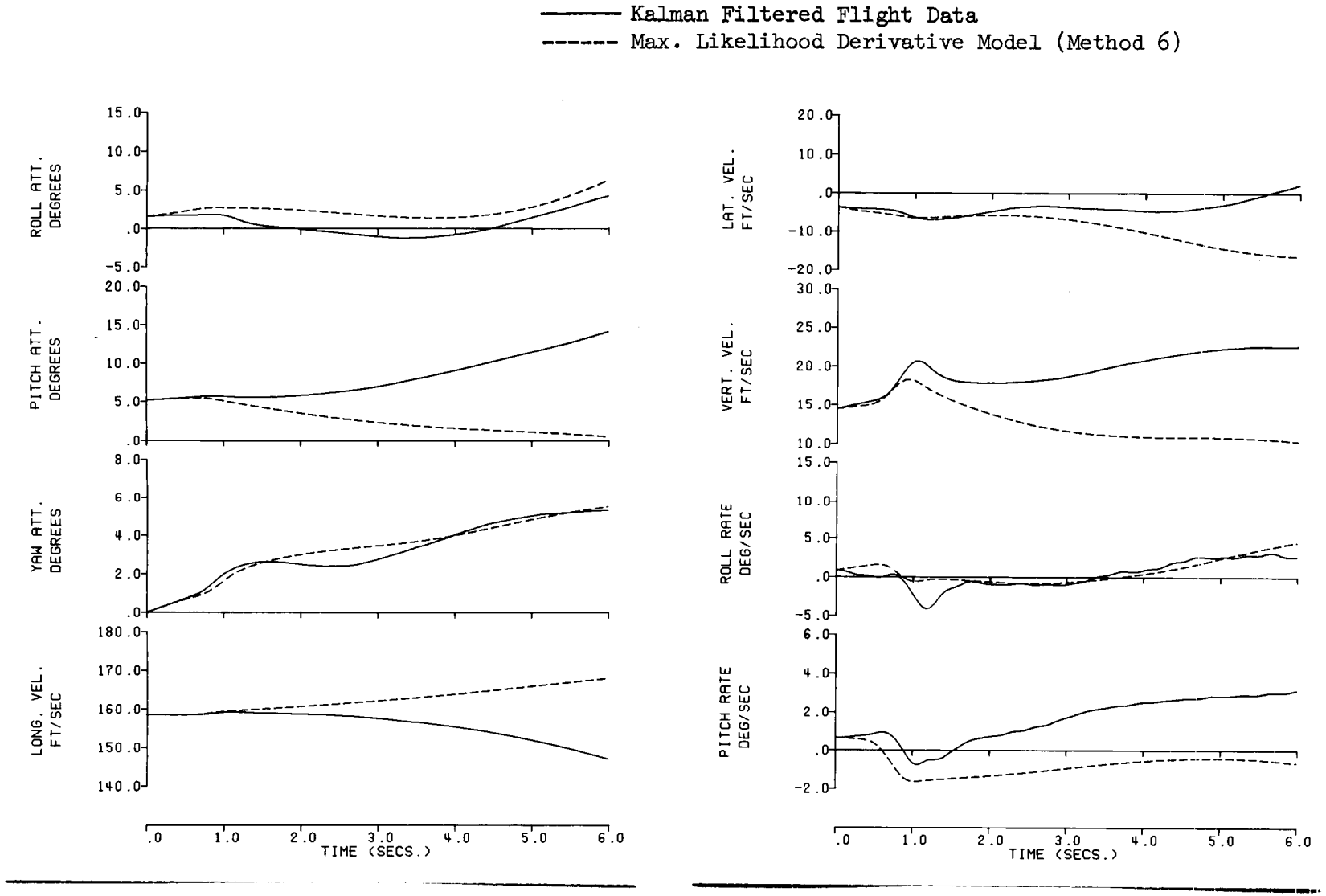


Figure 57. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 4).

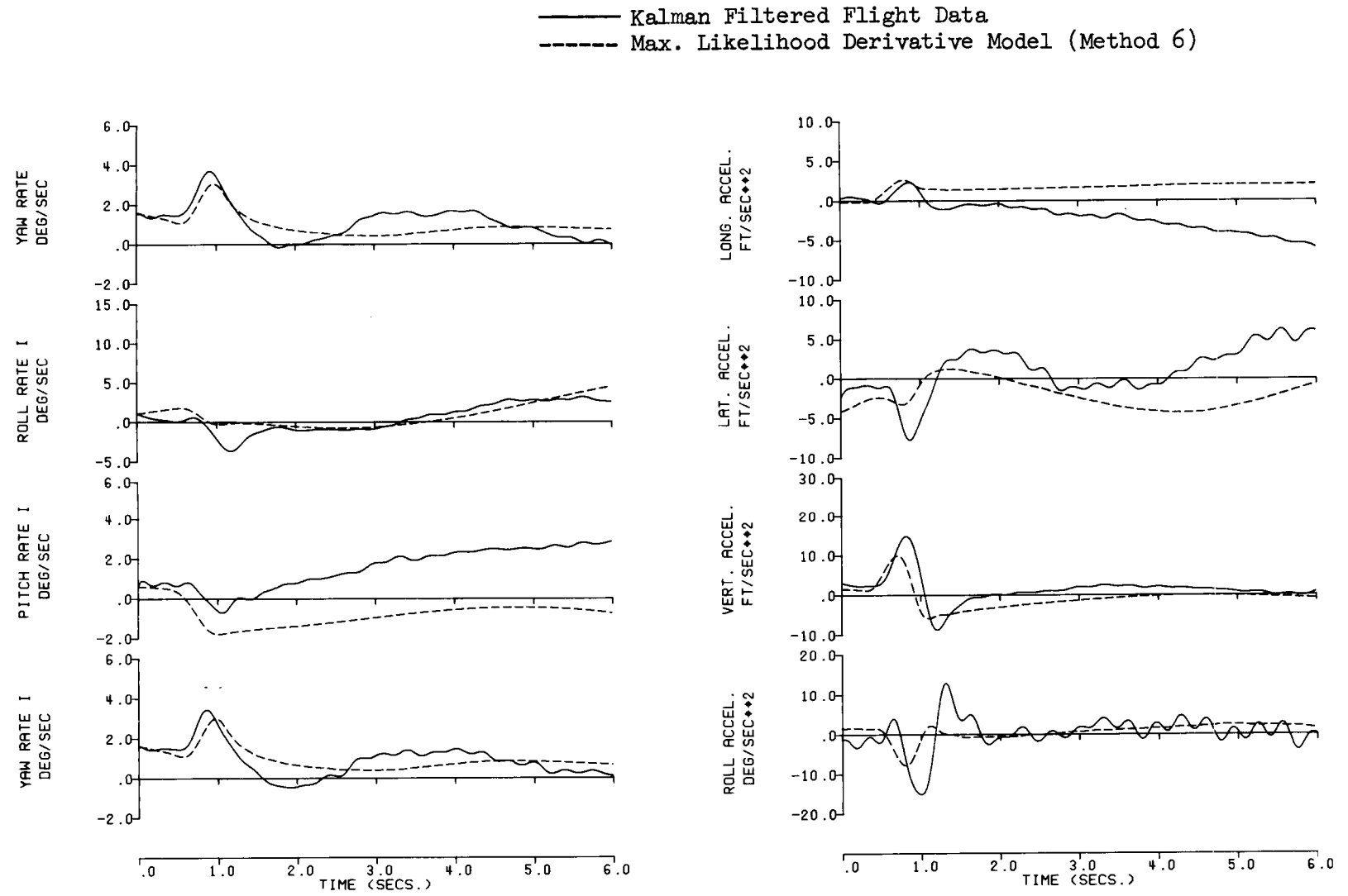
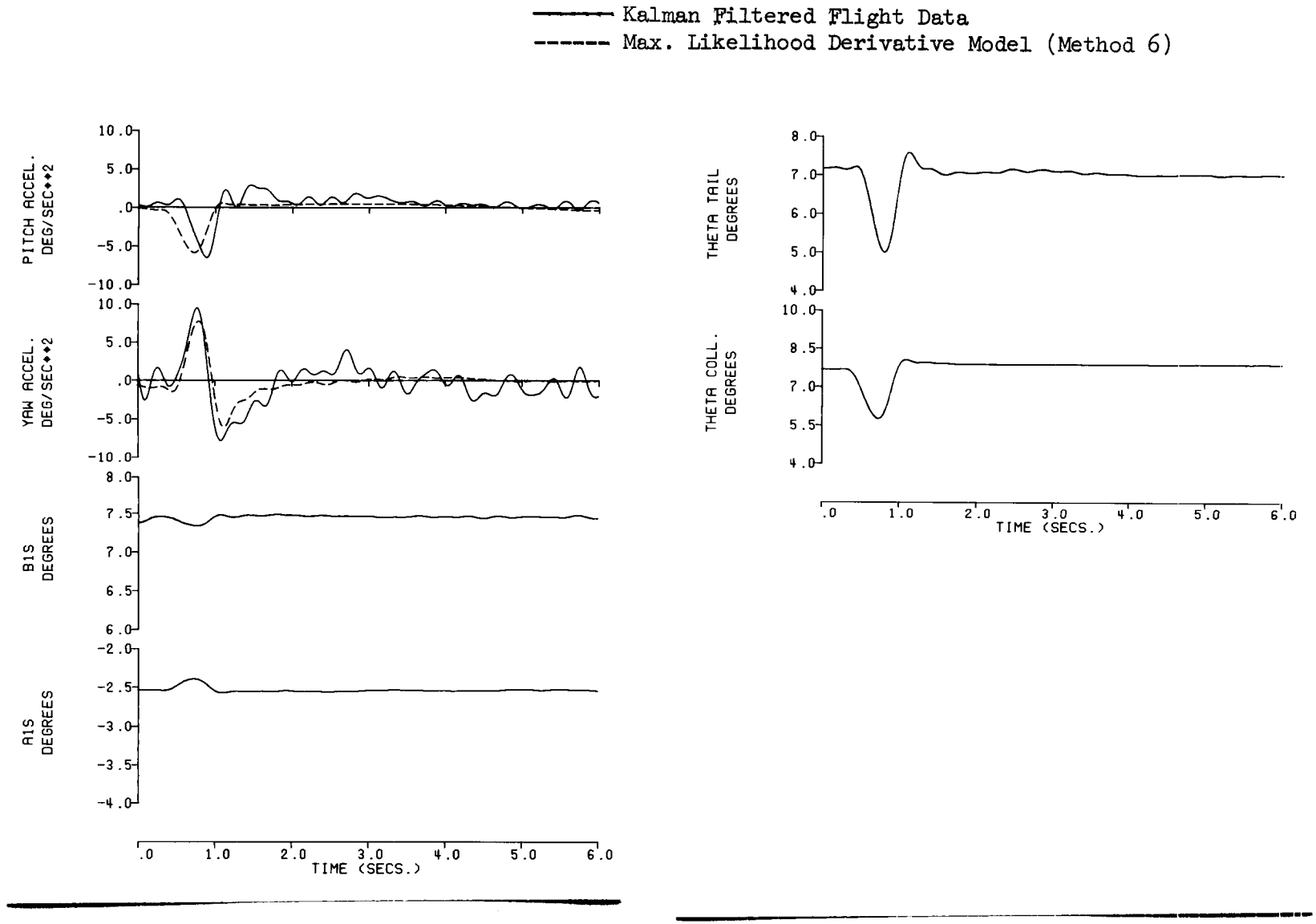


Figure 57. - Continued.



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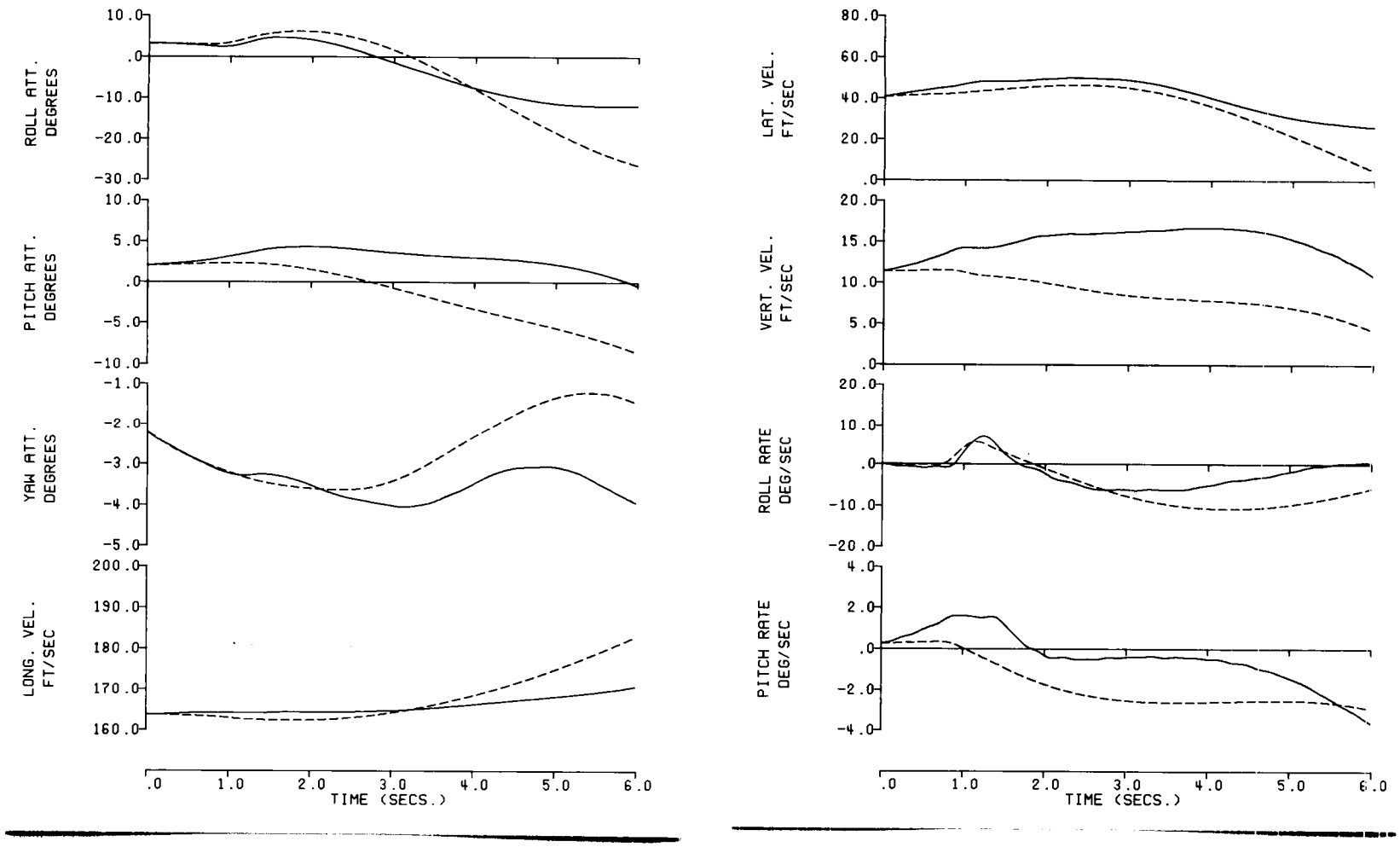


Figure 58. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 5).

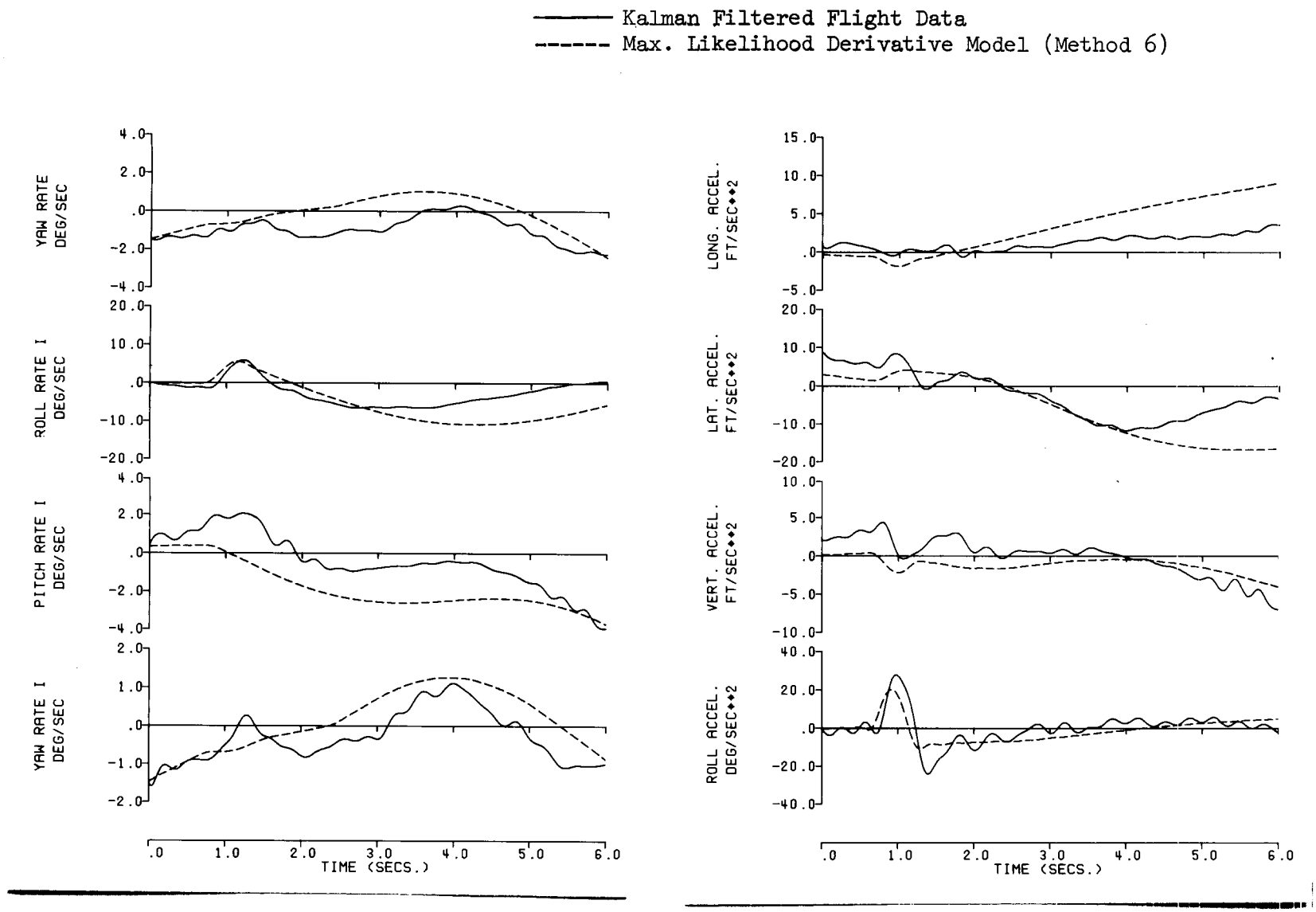
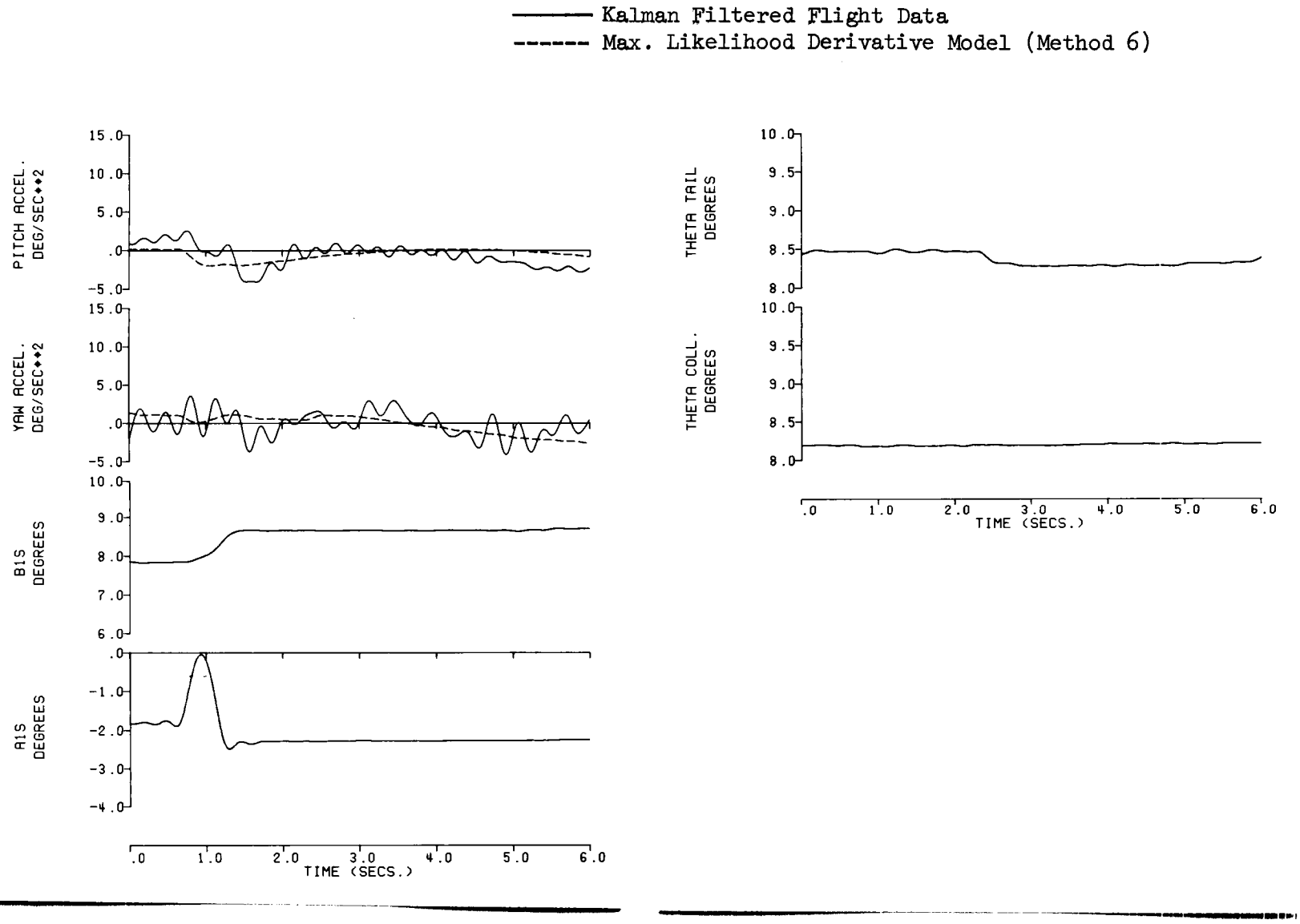


Figure 58. - Continued.



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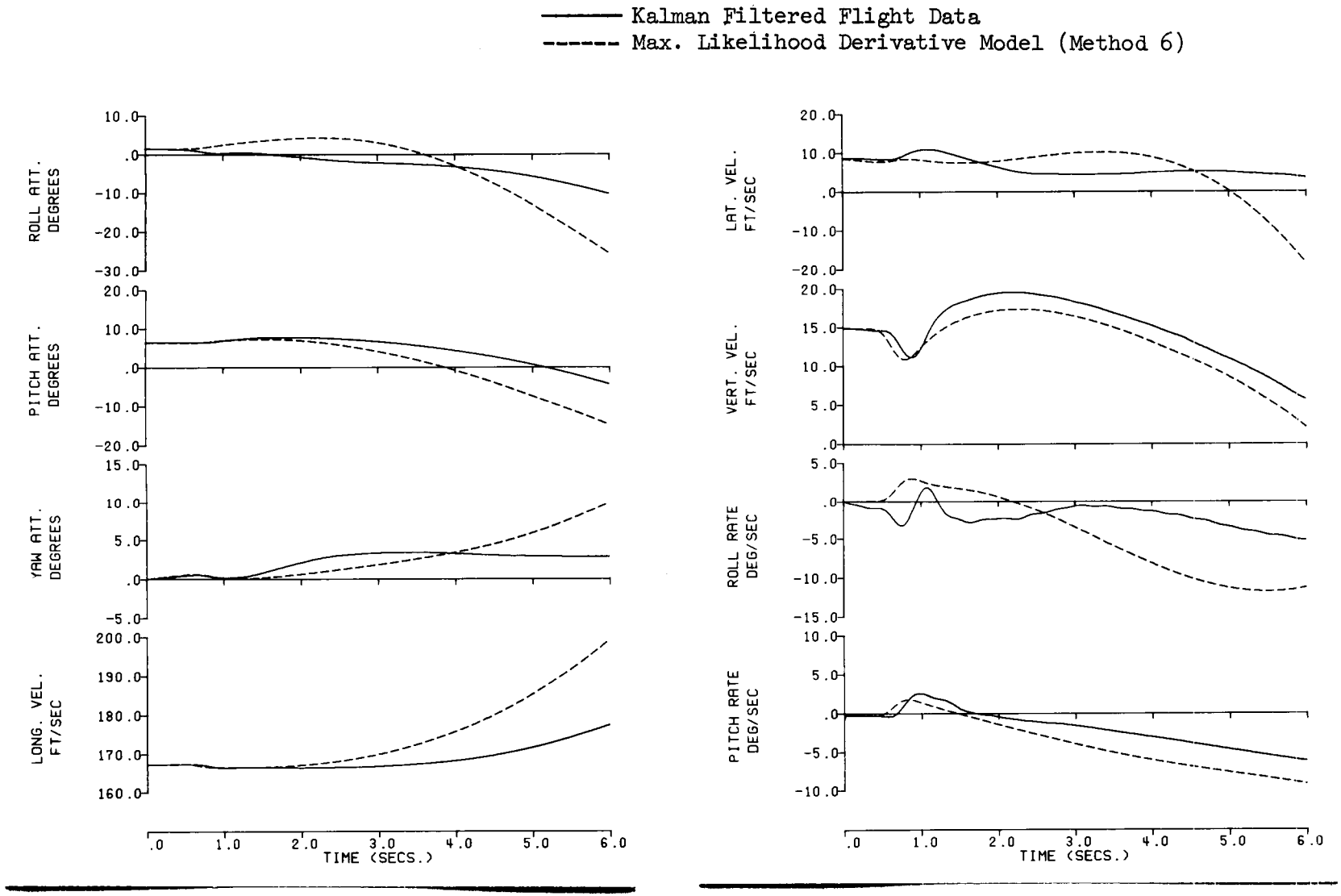


Figure 59. - Time History Comparison of Identified Derivative Model Against CH-53A Flight Data (100 knots, Maneuver 6).

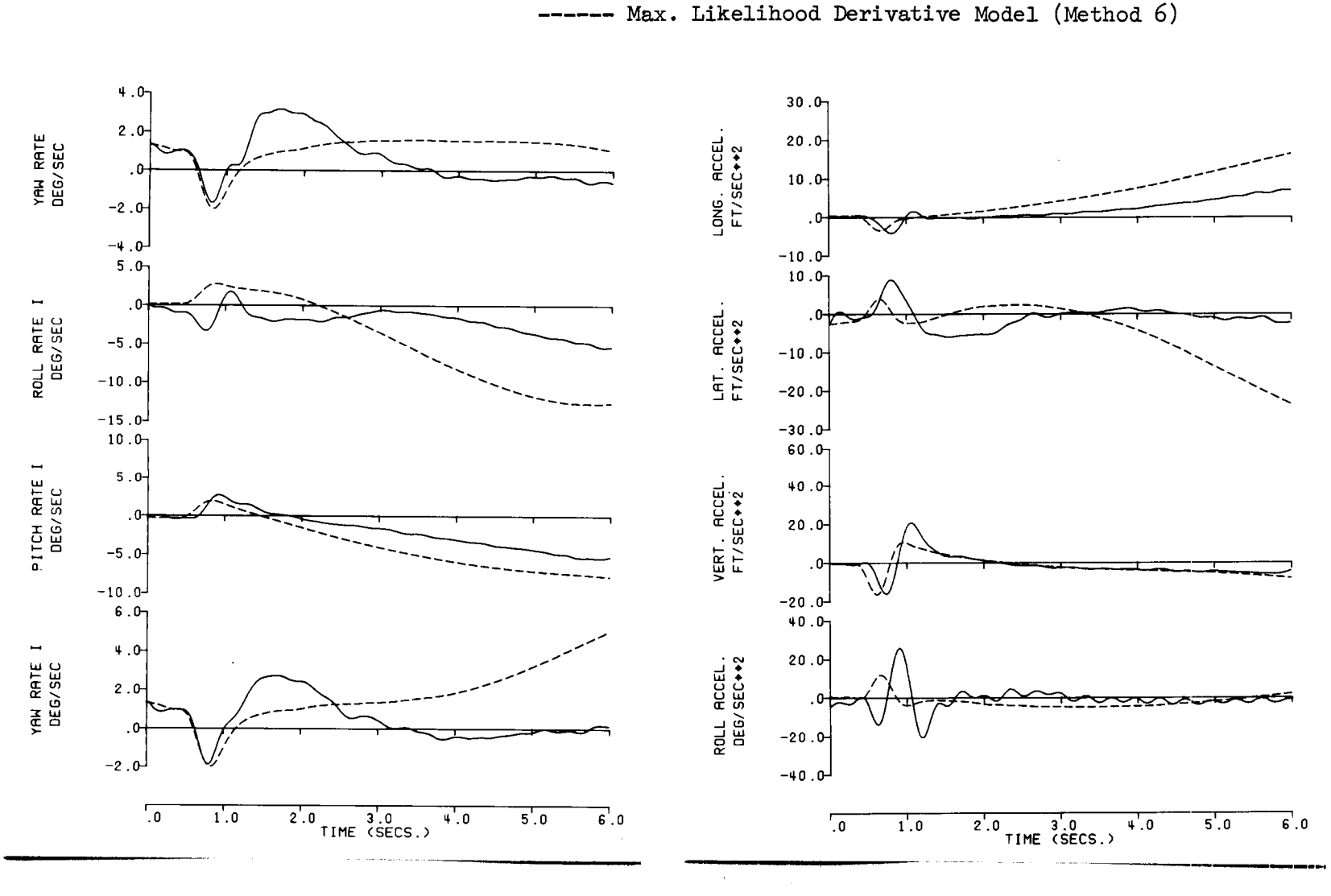
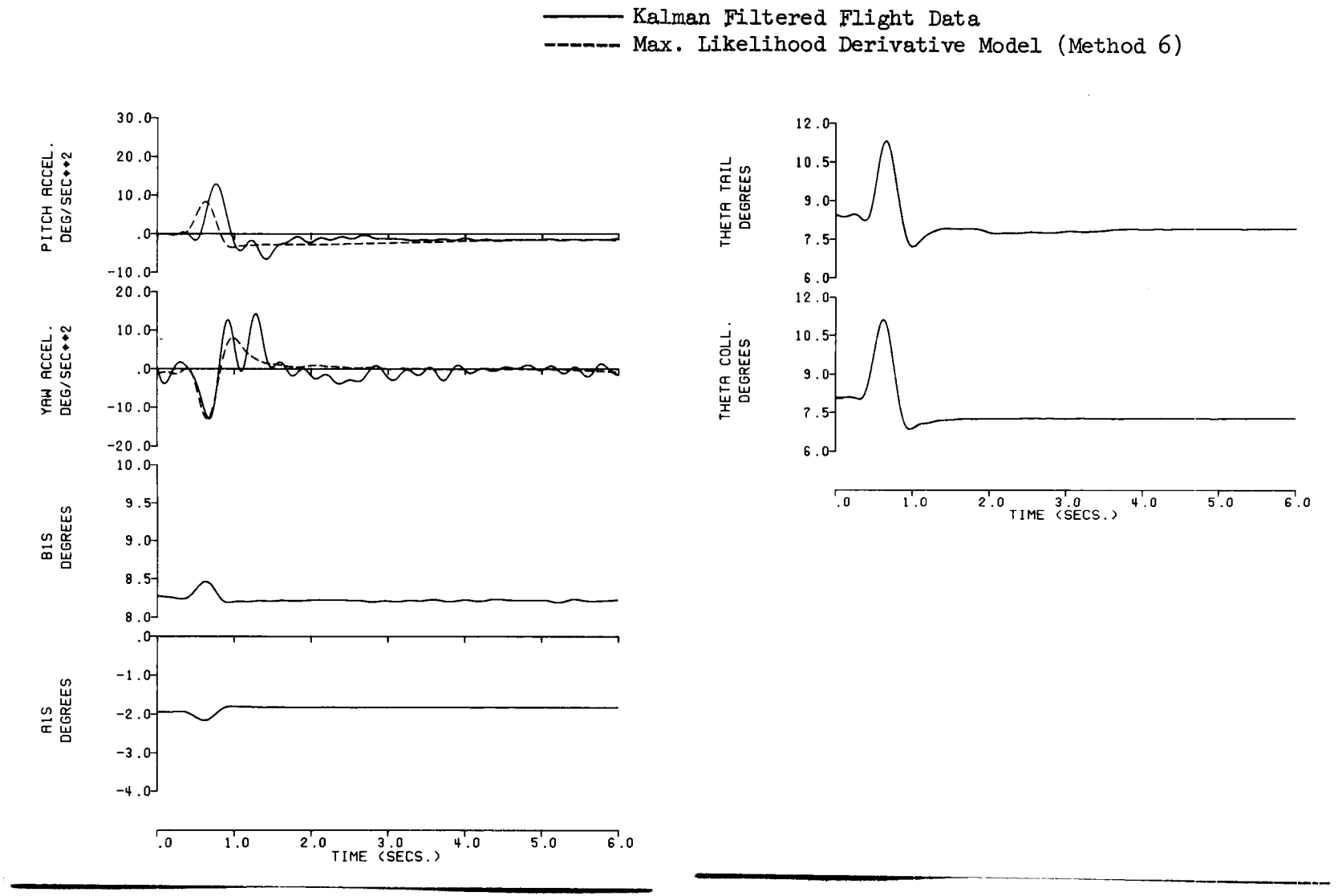


Figure 59. - Continued.



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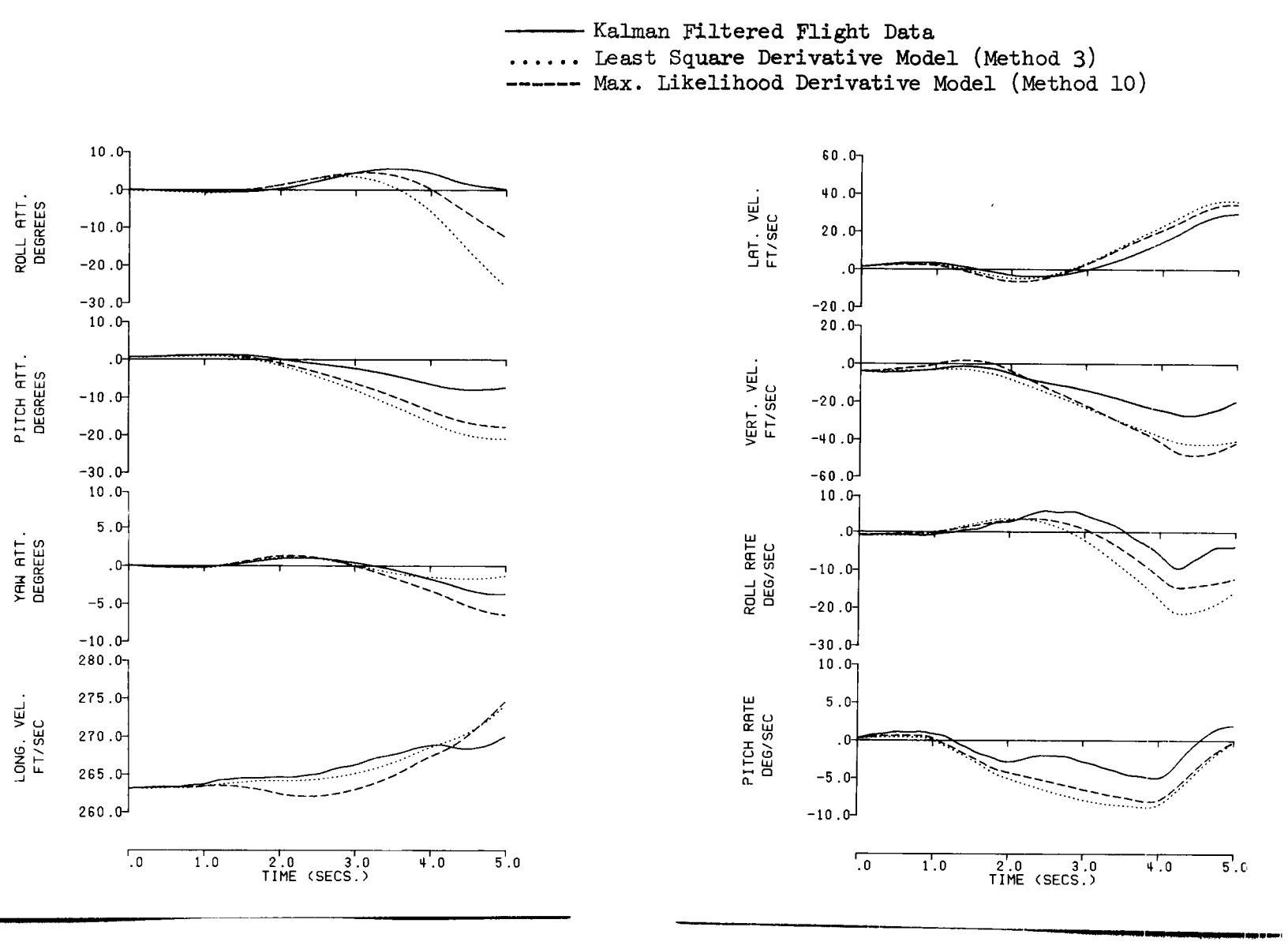


Figure 60. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (150 knots, Maneuver 1).

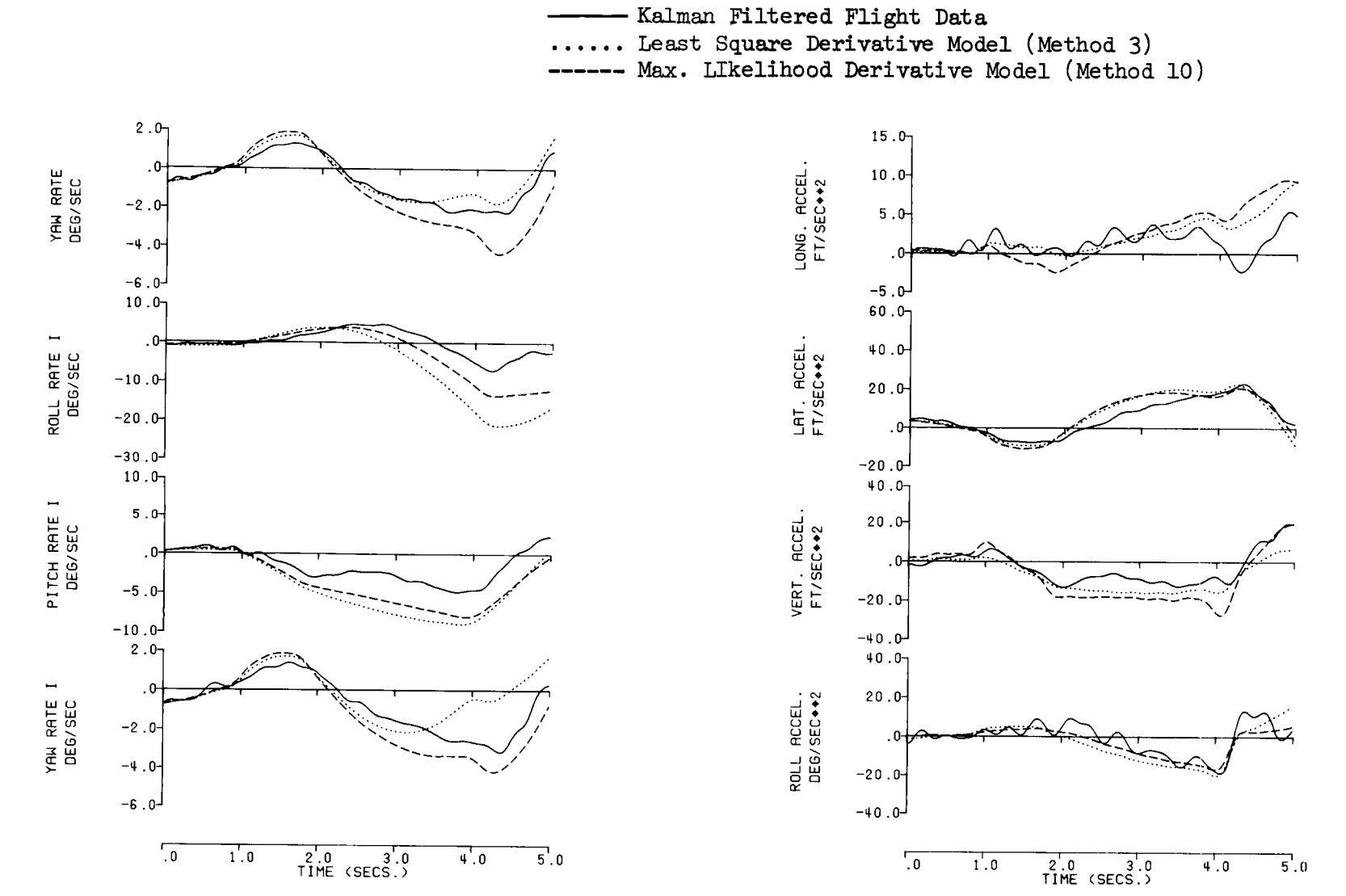
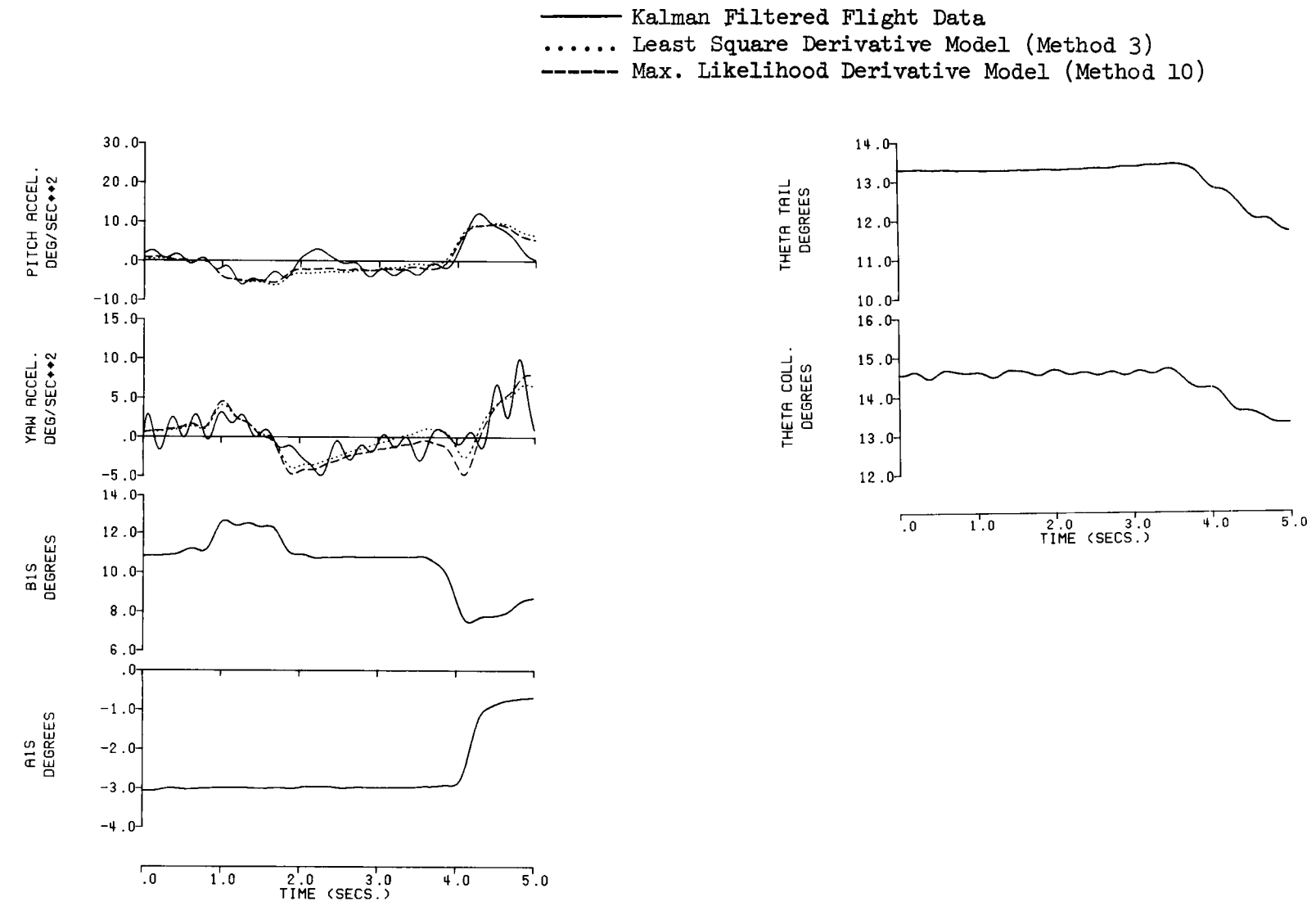


Figure 60. - Continued.



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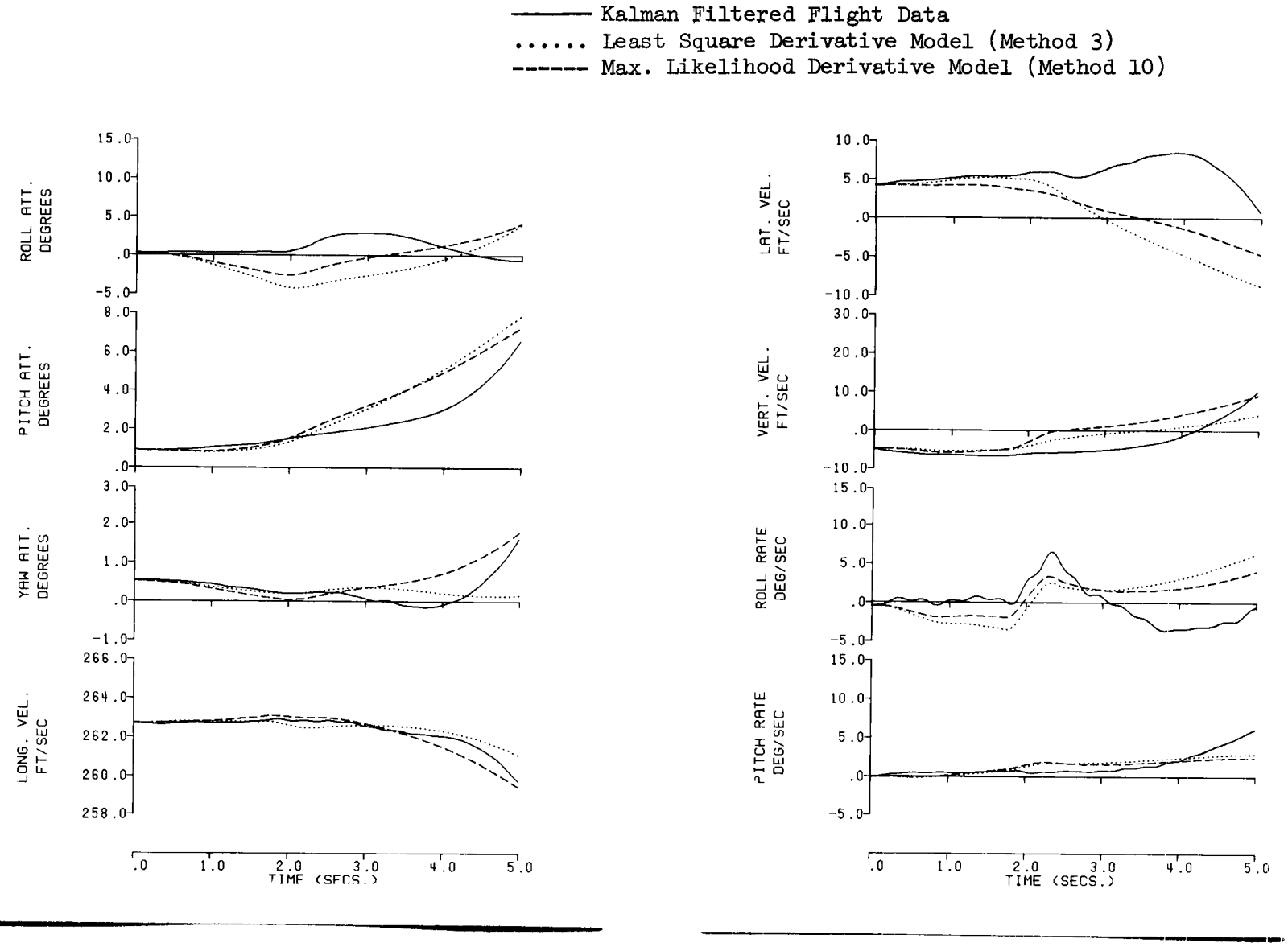


Figure 61. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (150 knots, Maneuver 2).

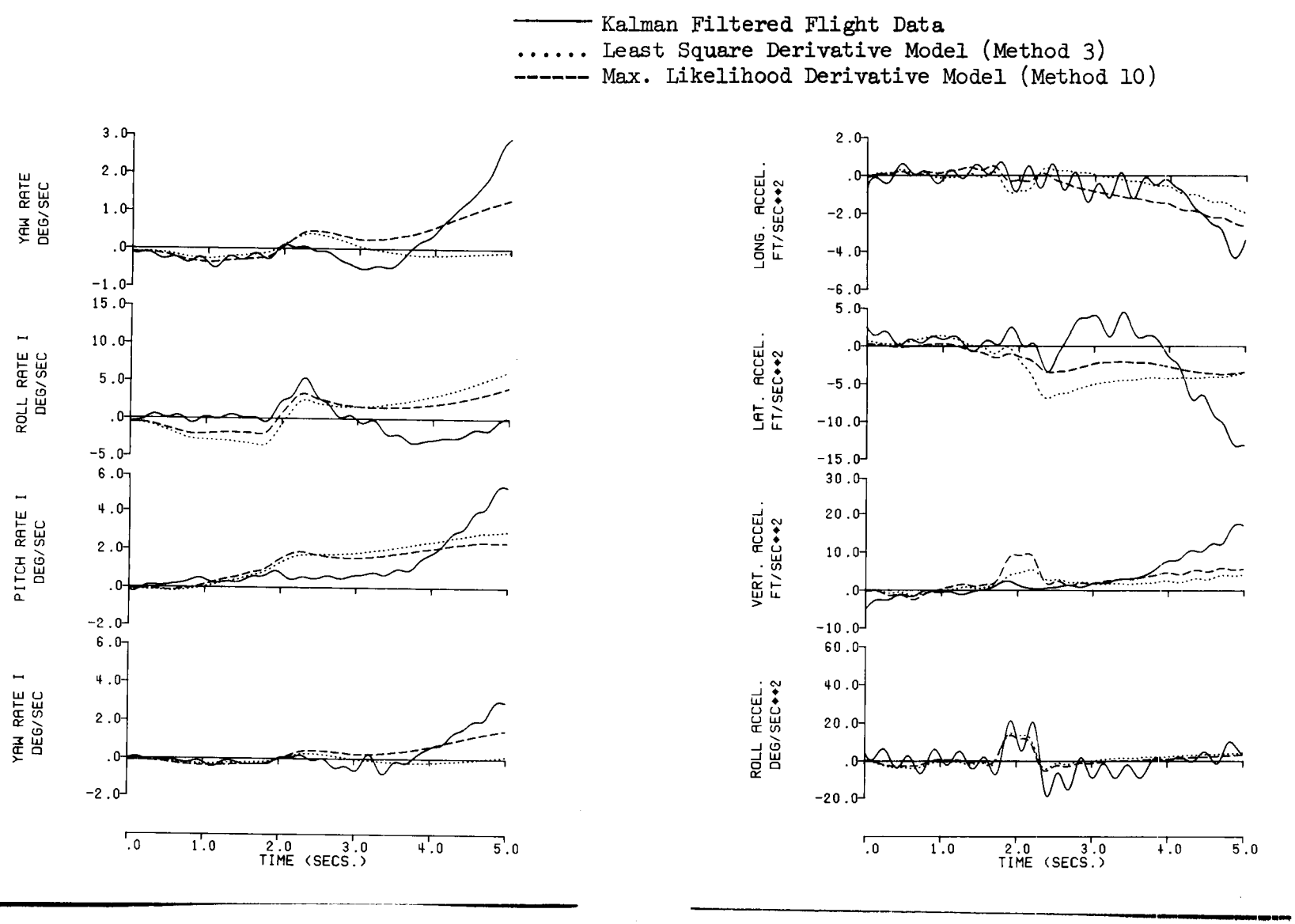


Figure 61. - Continued.

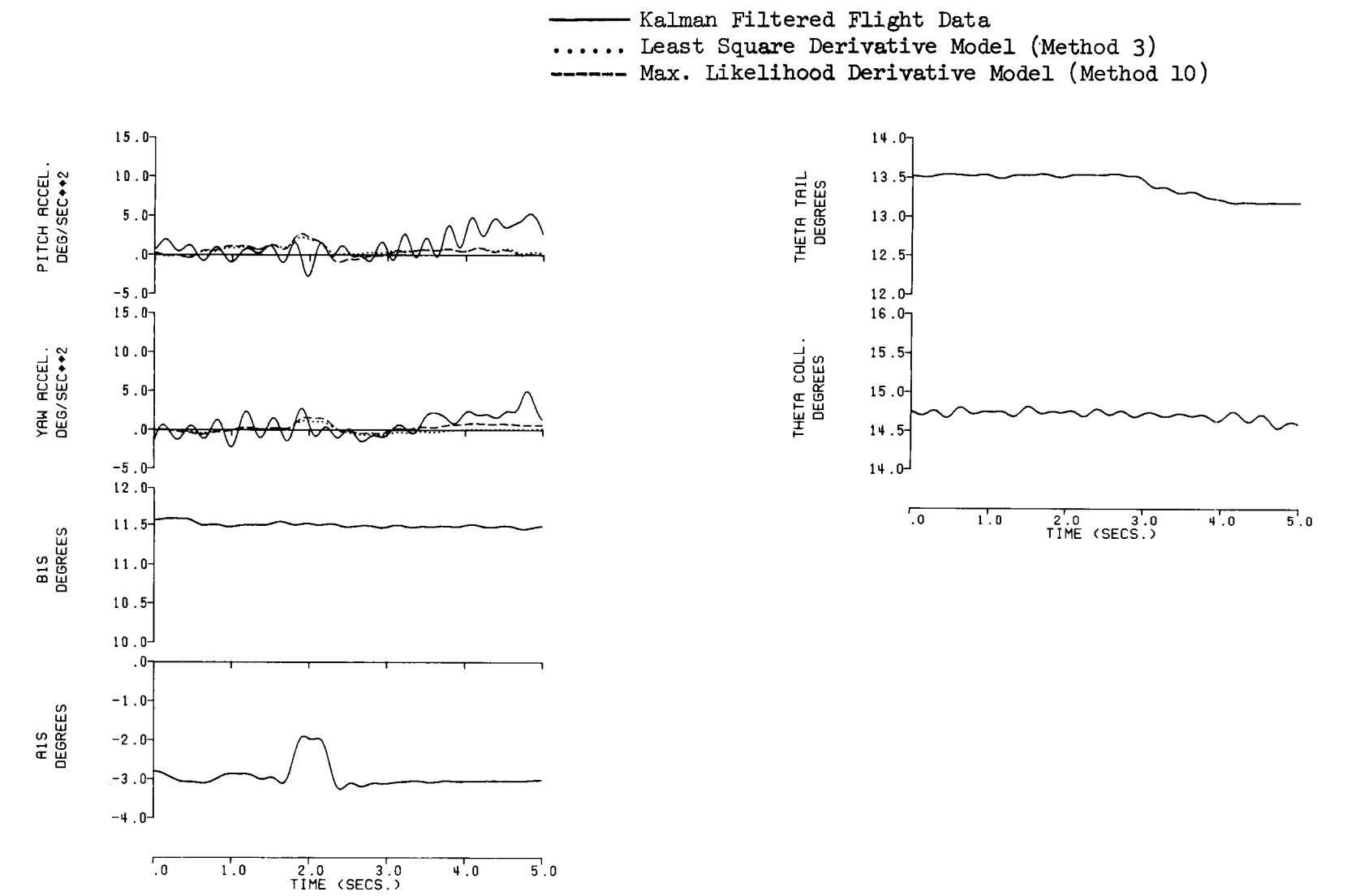


Figure 61. - Concluded.

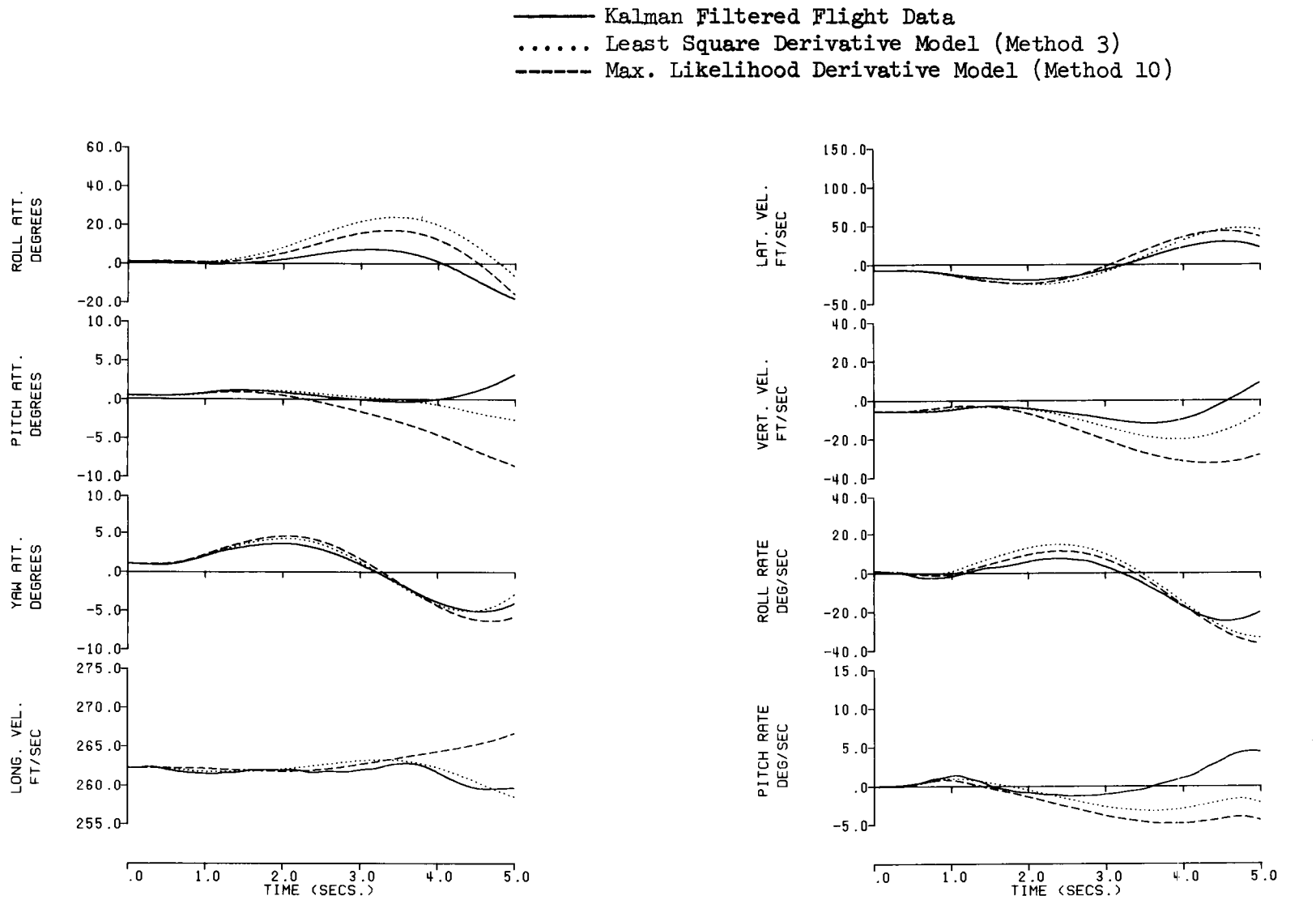


Figure 62 - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (150 knots, Maneuver 3).

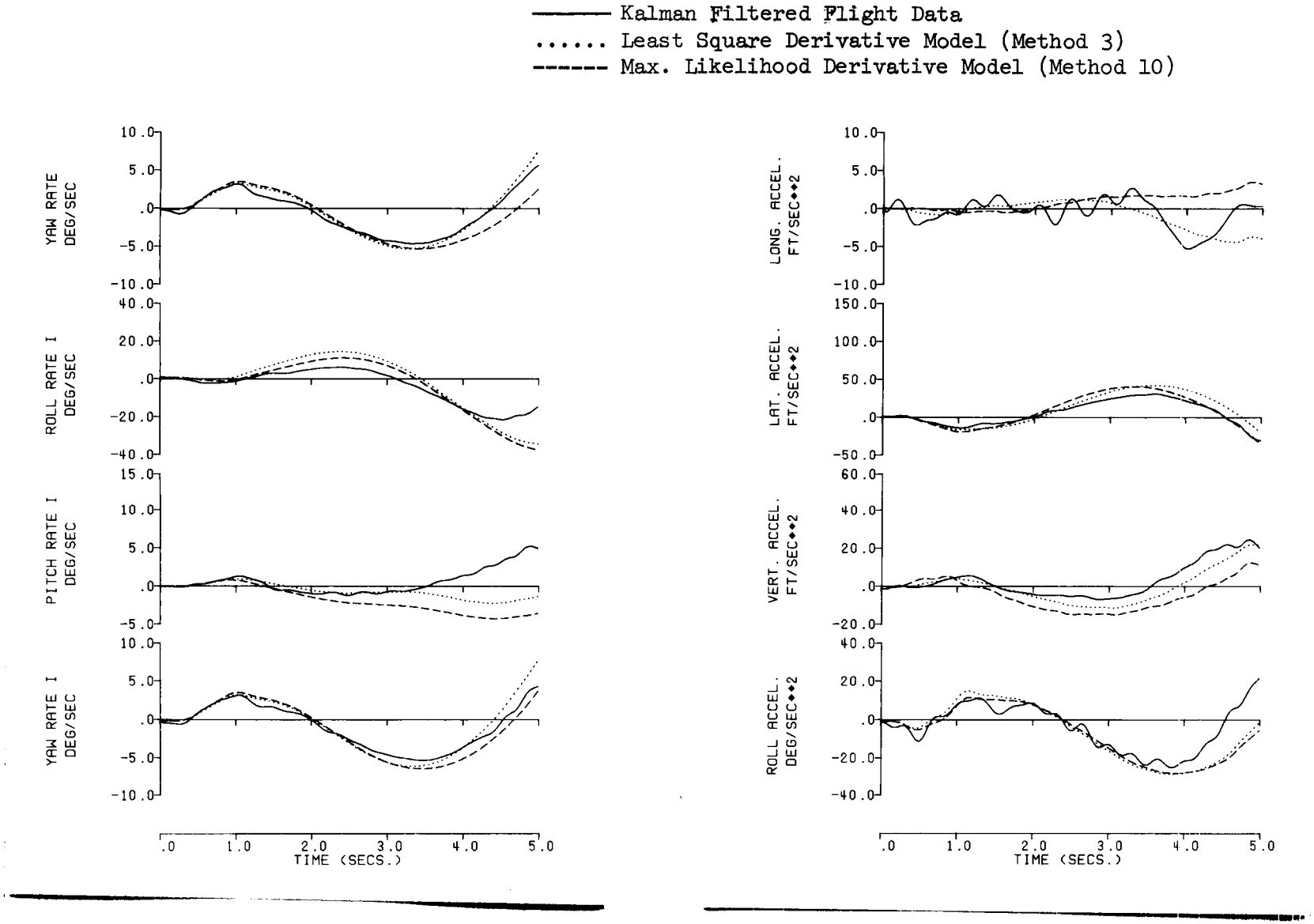
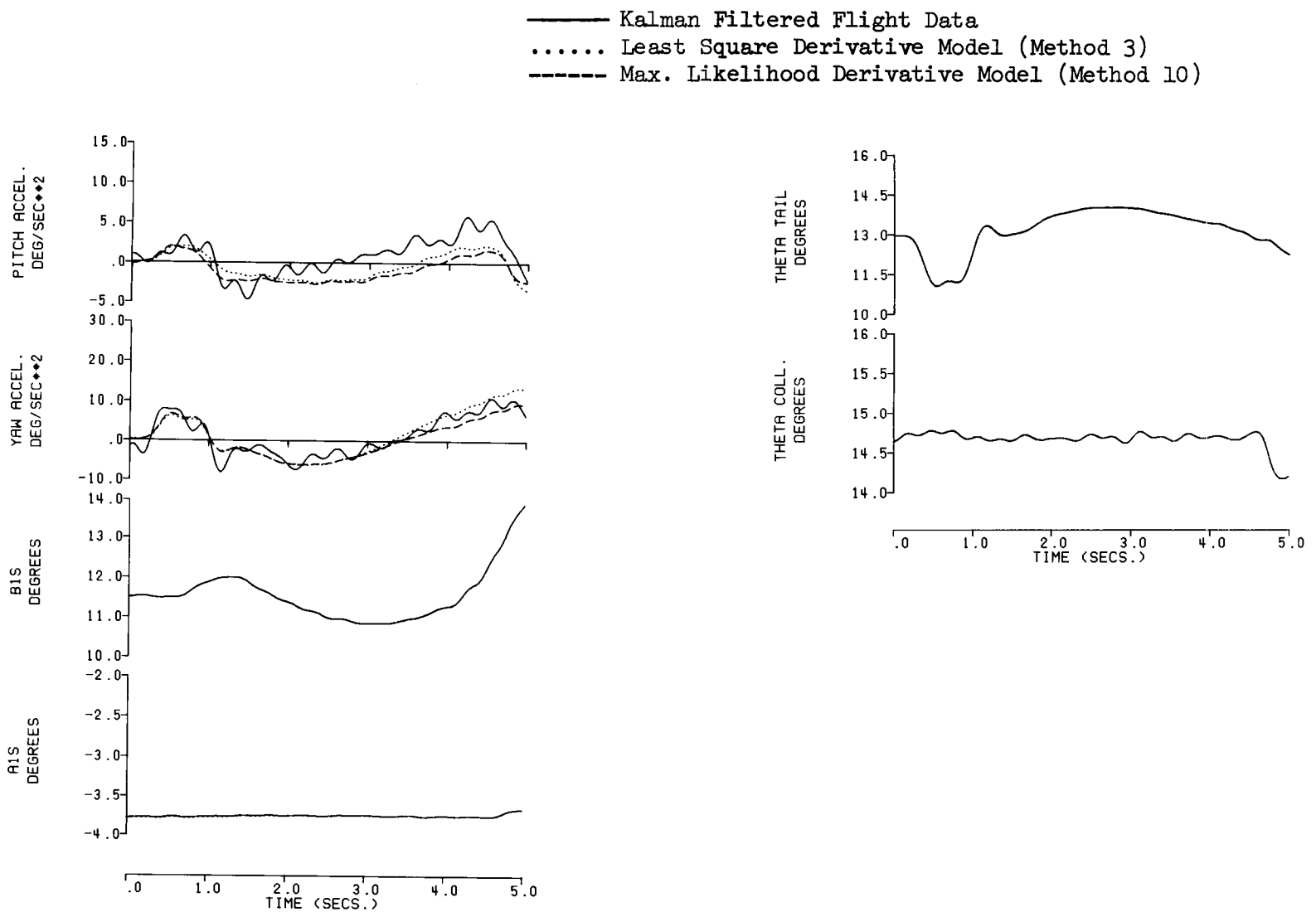


Figure 62. - Continued.



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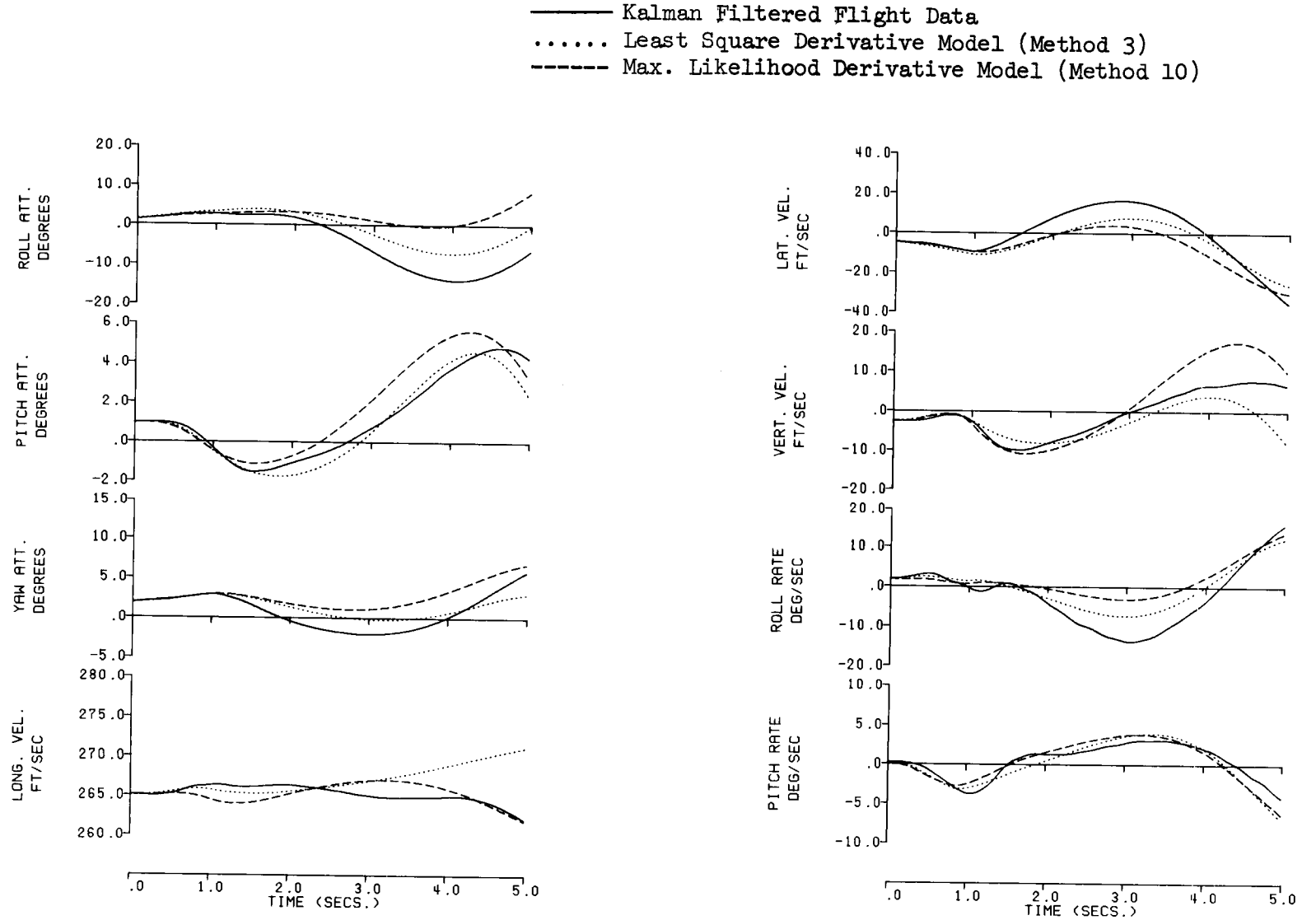

Figure 63. - Time History Comparison of Identified Derivative Models Against CH-53A Flight Data (150 knots, Maneuver 4).

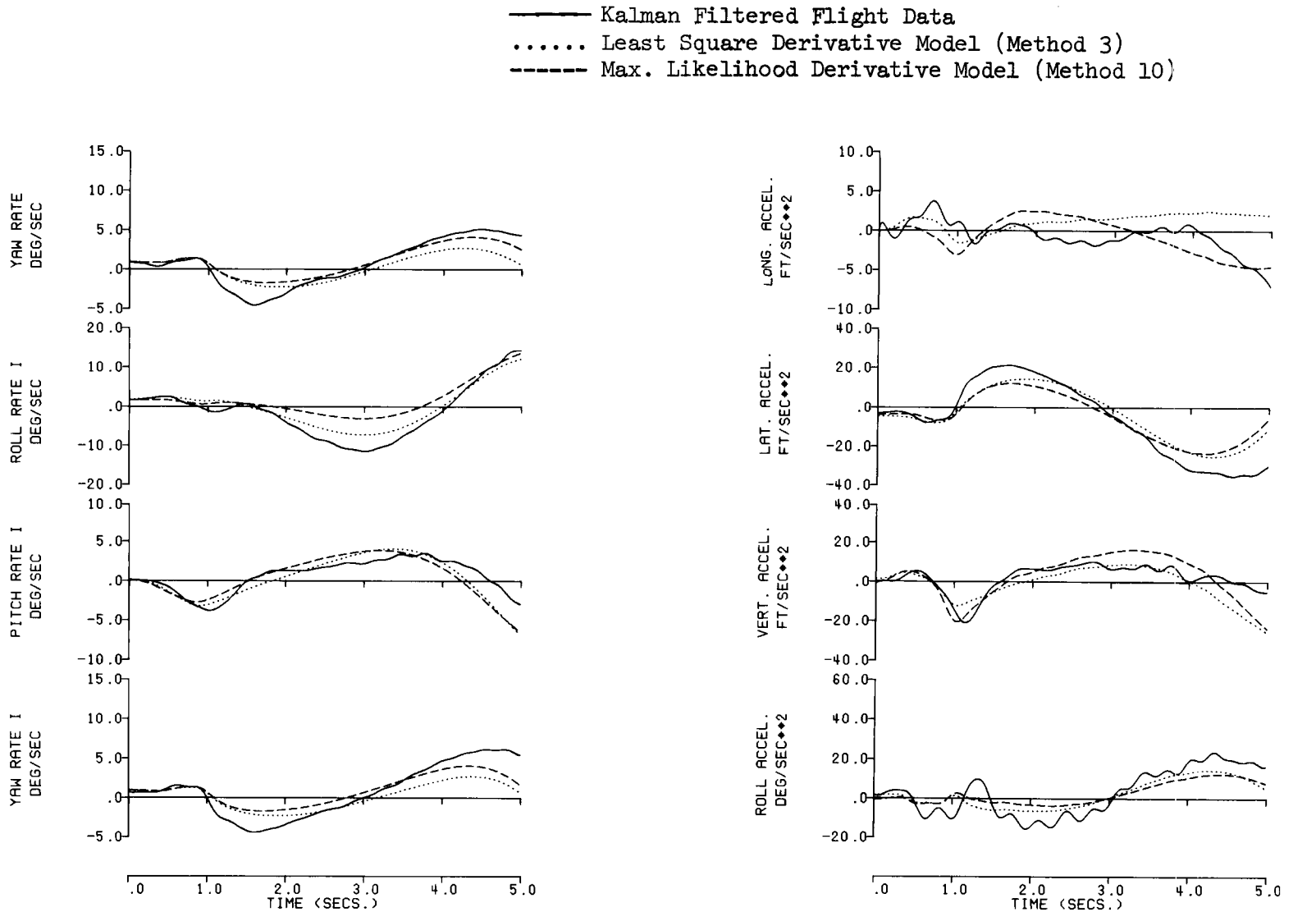

Figure 63. - Continued.

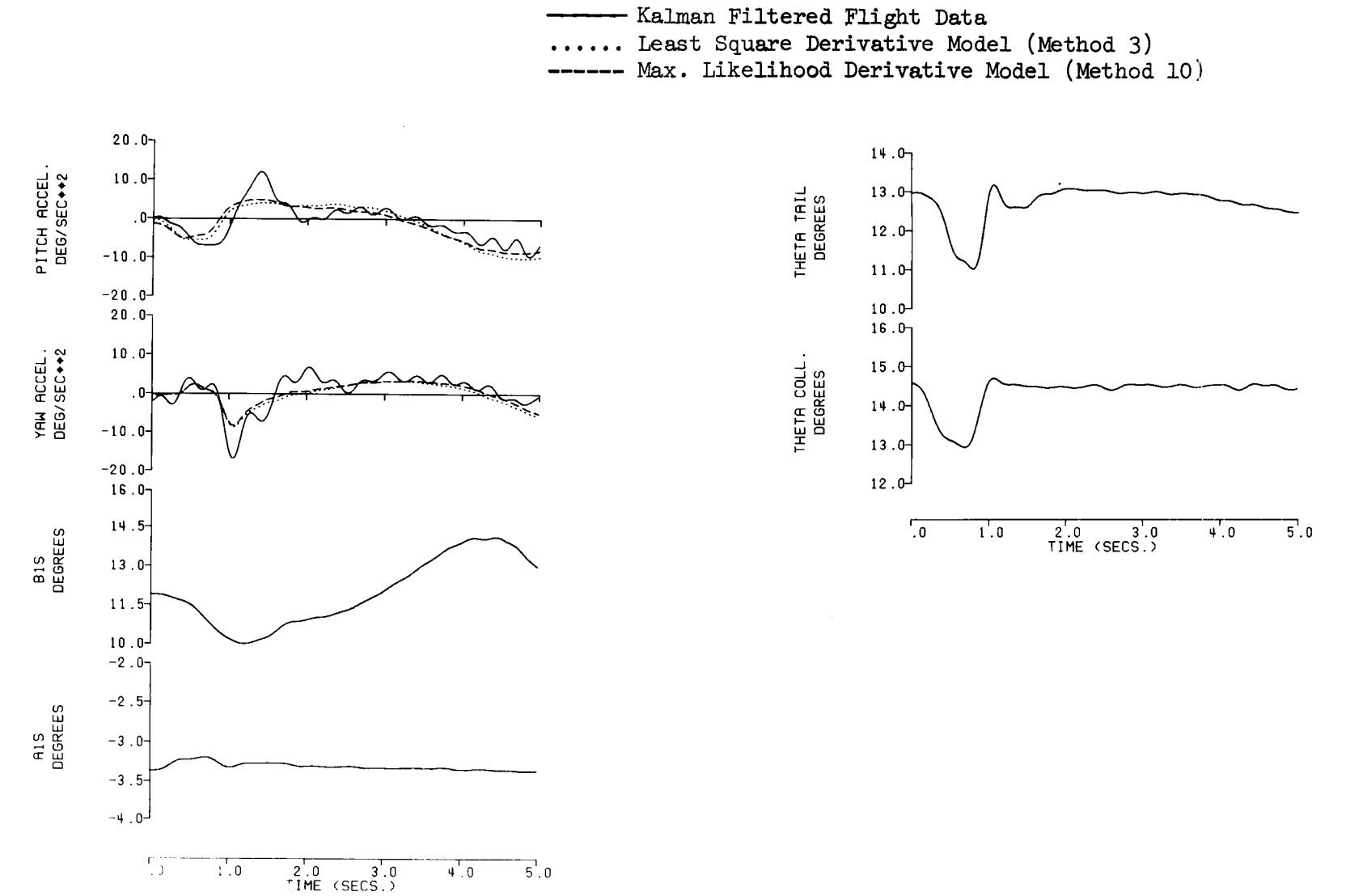

Figure 63. - Concluded.

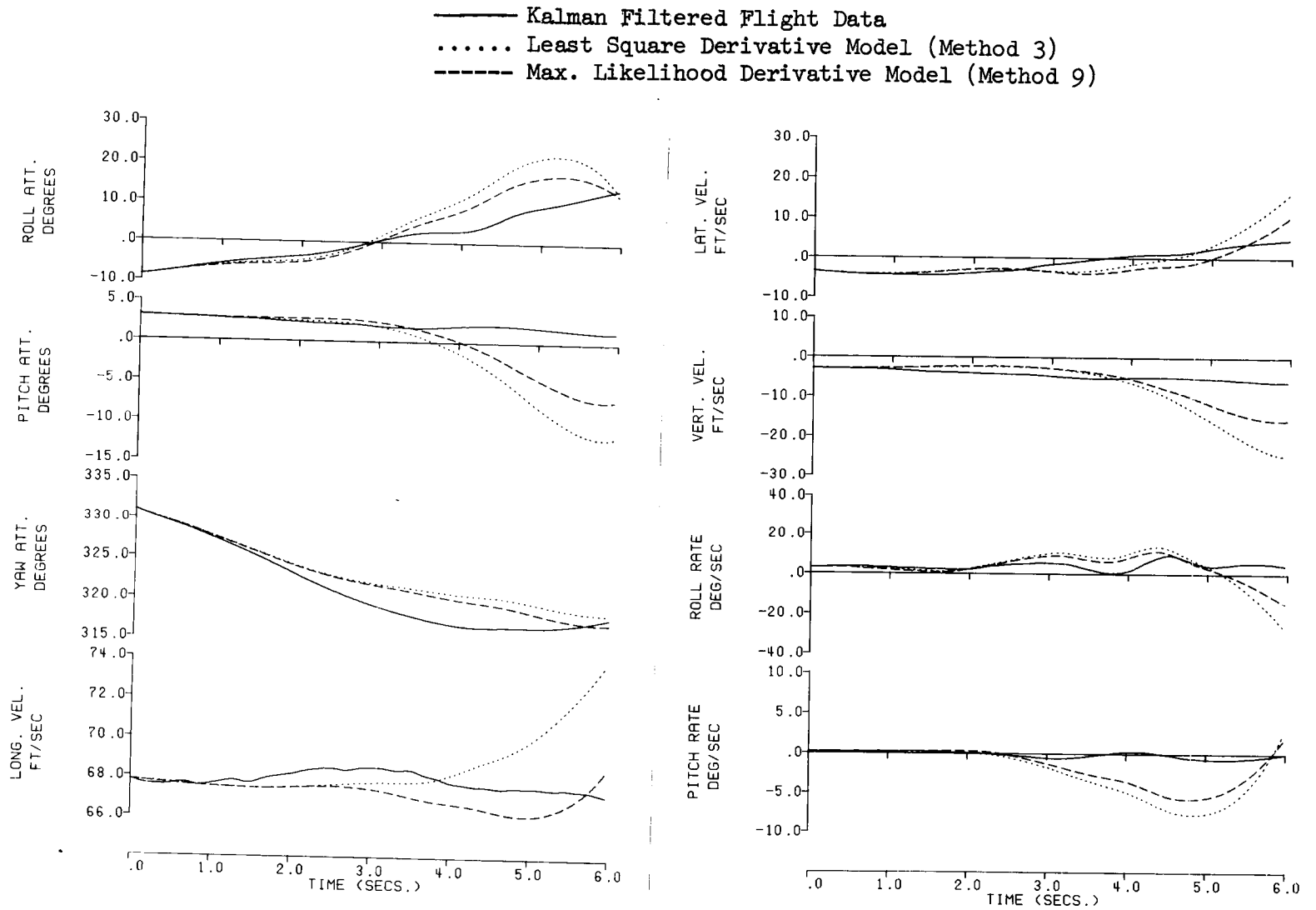

Figure 64 . - Time History Comparison of Identified Derivative Models Against CH-54B Flight Data (45 knots, Maneuver 1).

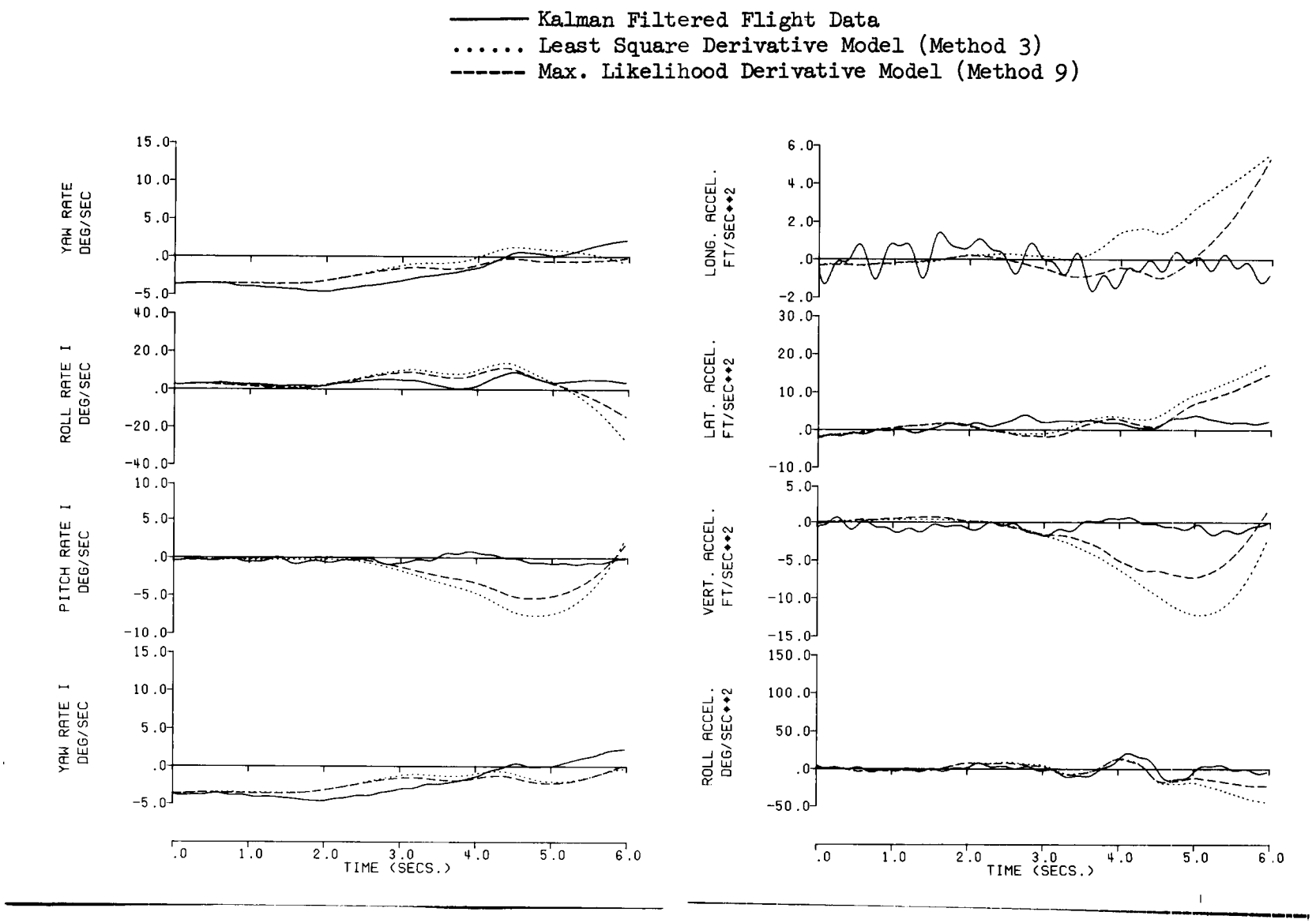

Figure 64. - Continued.

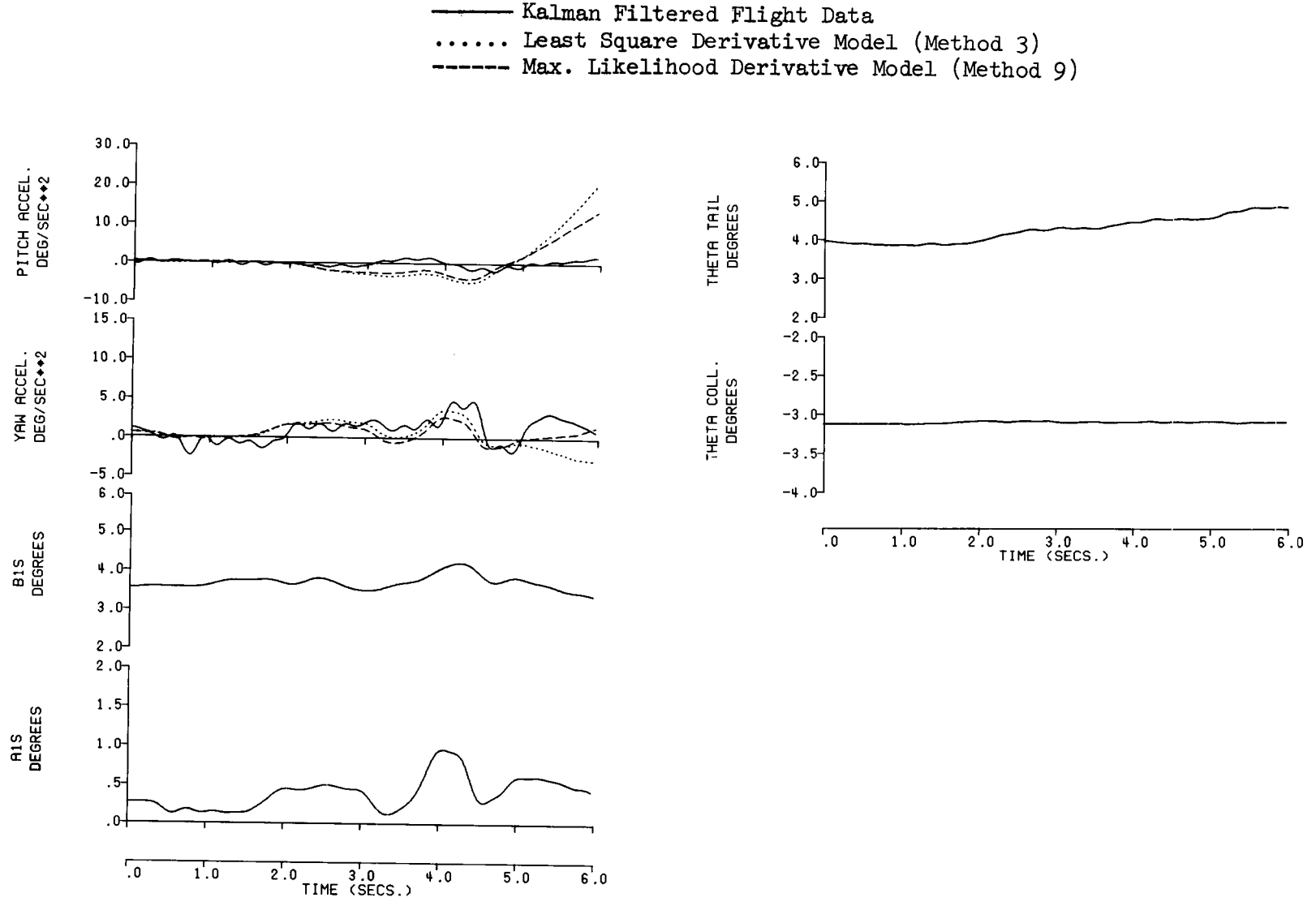

Figure 64. - Concluded.

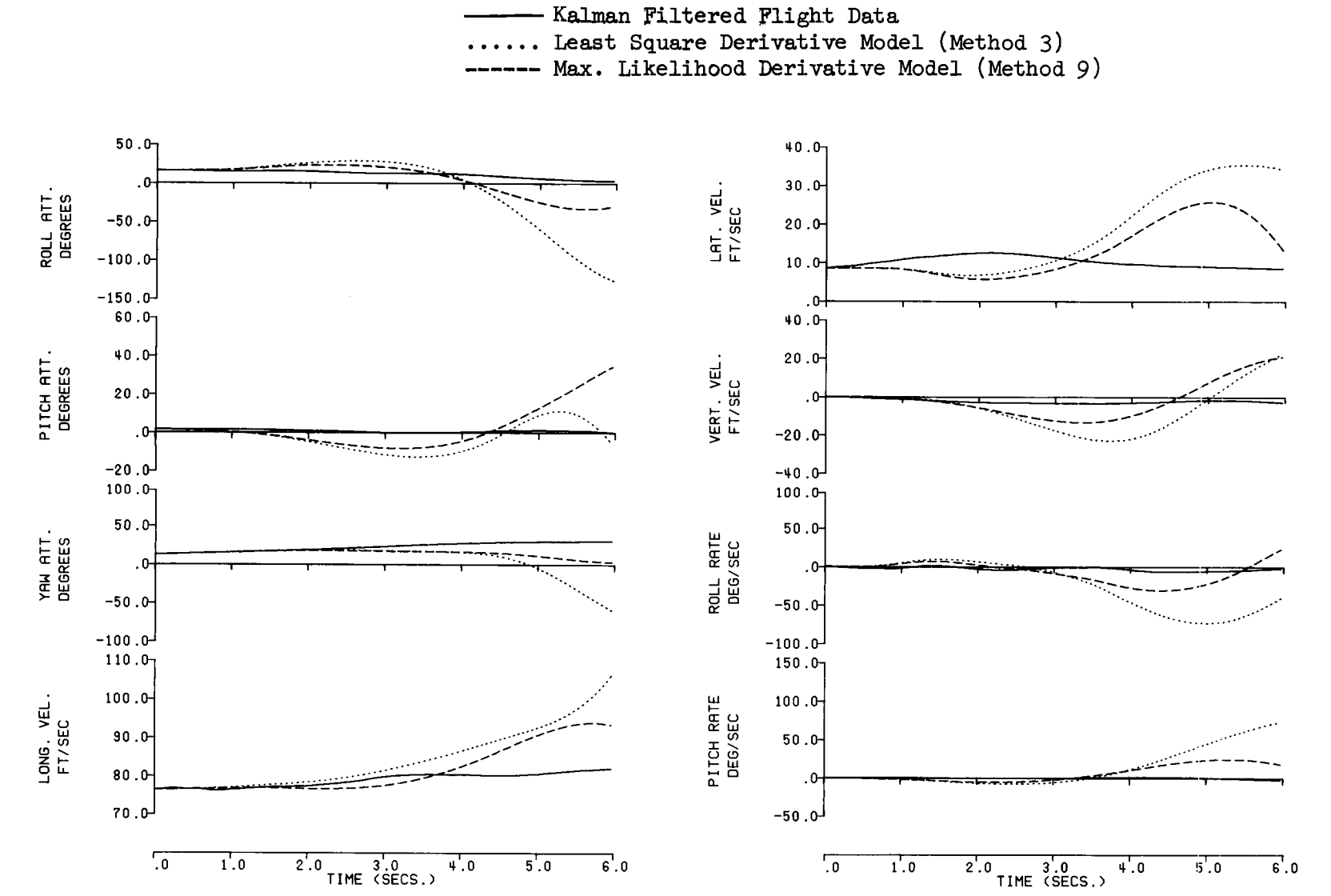

Figure 65. - Time History Comparison of Identified Derivative Models Against CH-54B Flight Data (45 knots, Maneuver 2).

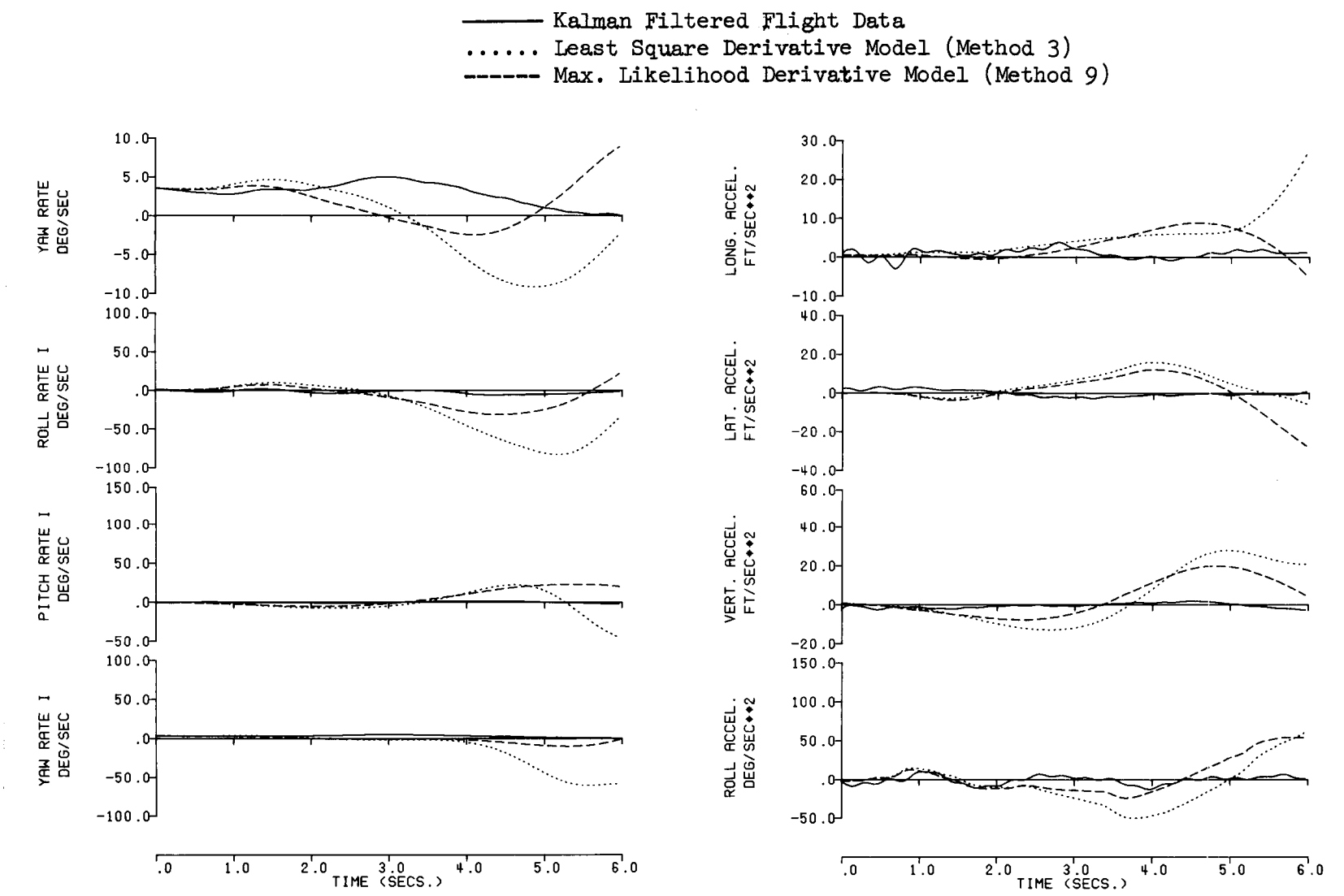

Figure 65. - Continued.

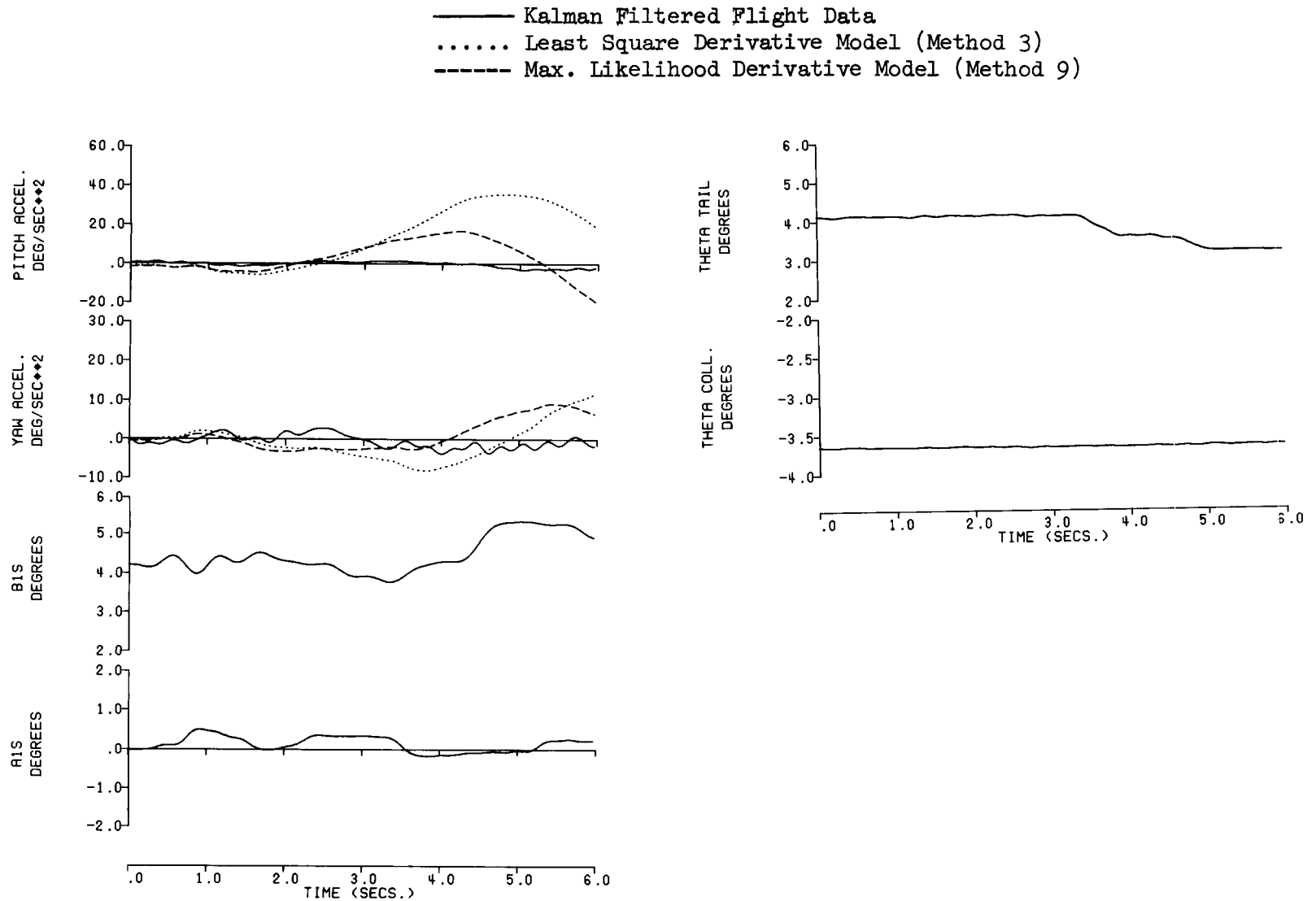

Figure 65. - Concluded.

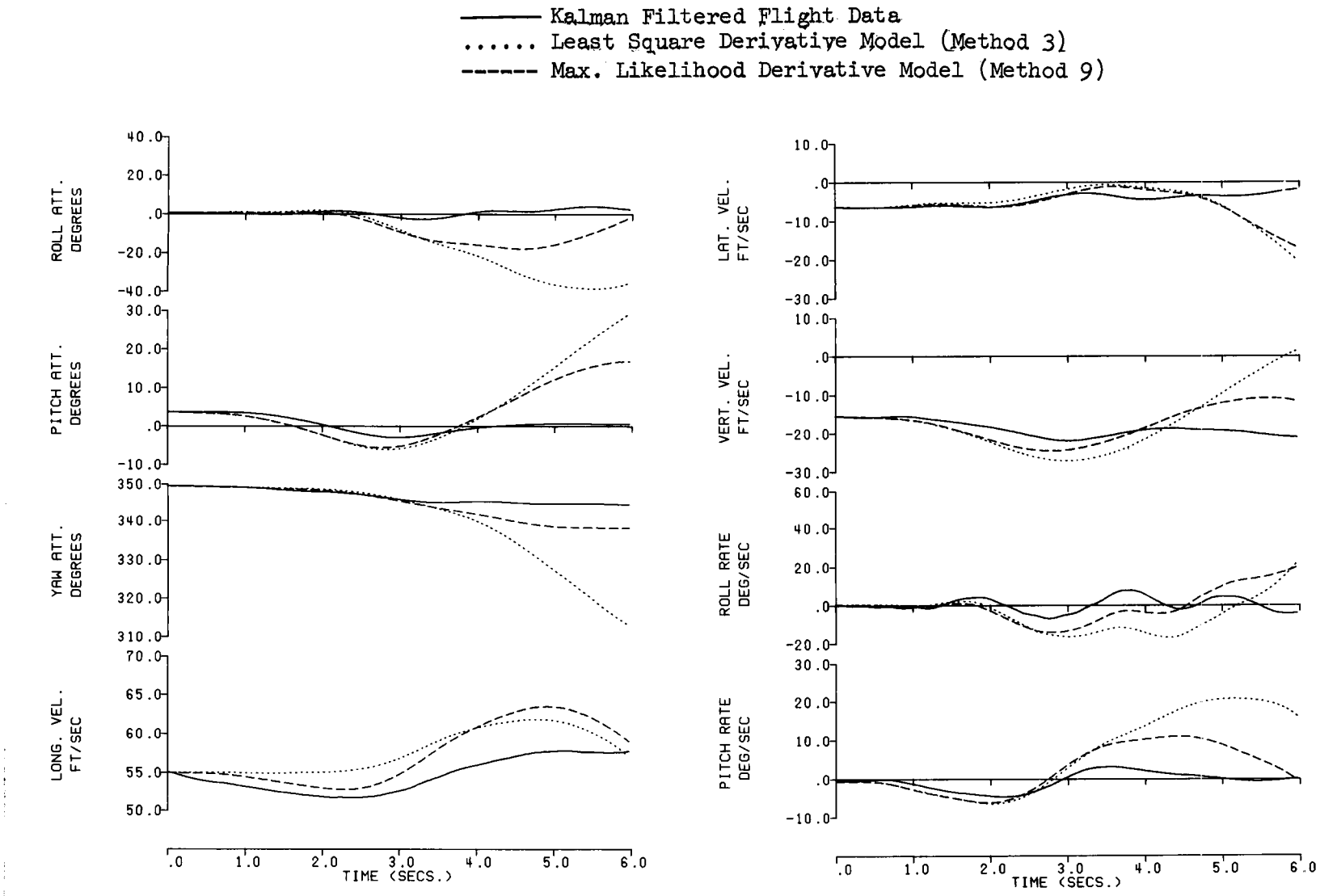

Figure 66. - Time History Comparison of Identified Derivative Models Against CH-54B Flight Data (45 knots, Maneuver 3).

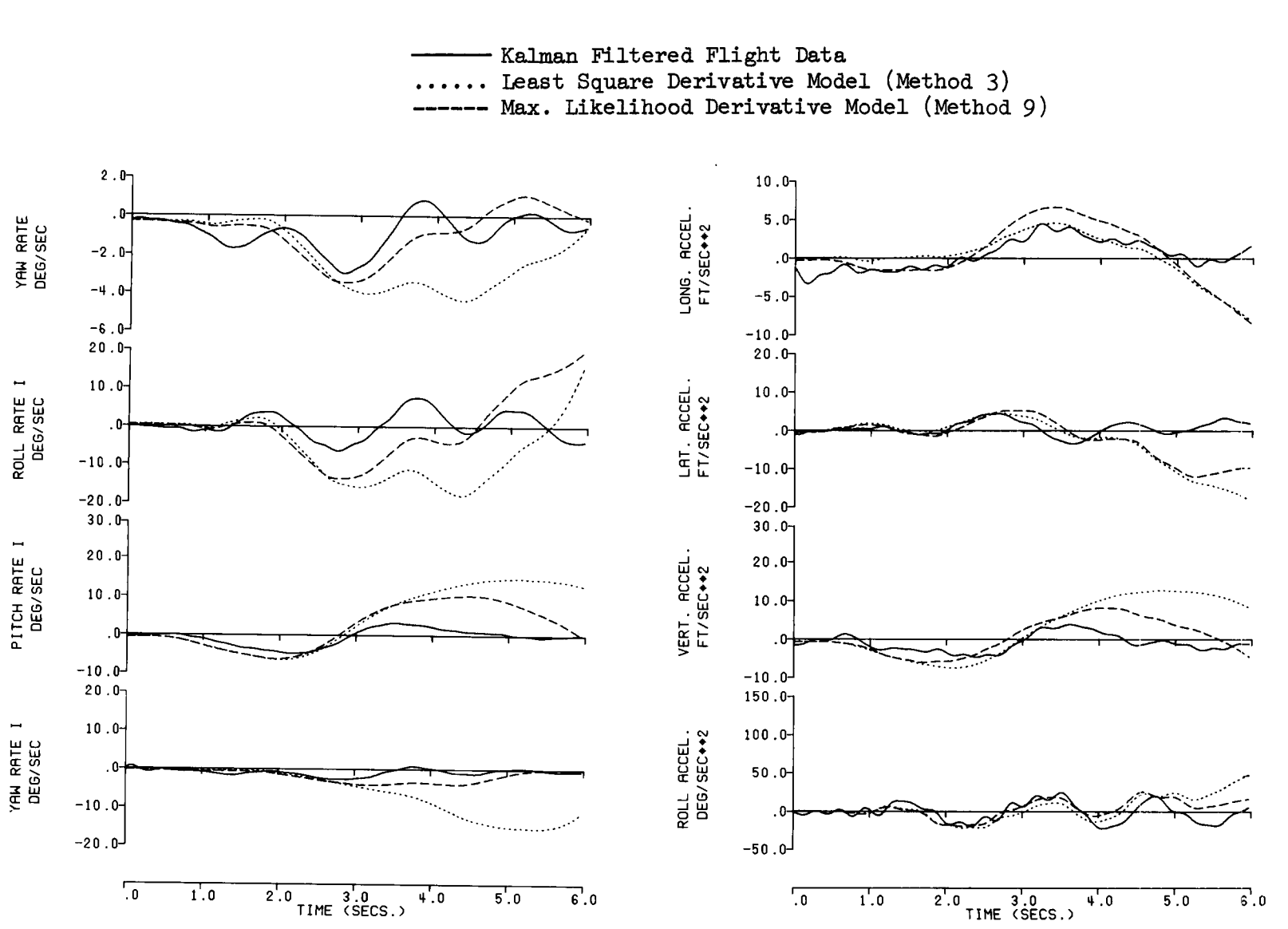

Figure 66 - Continued.

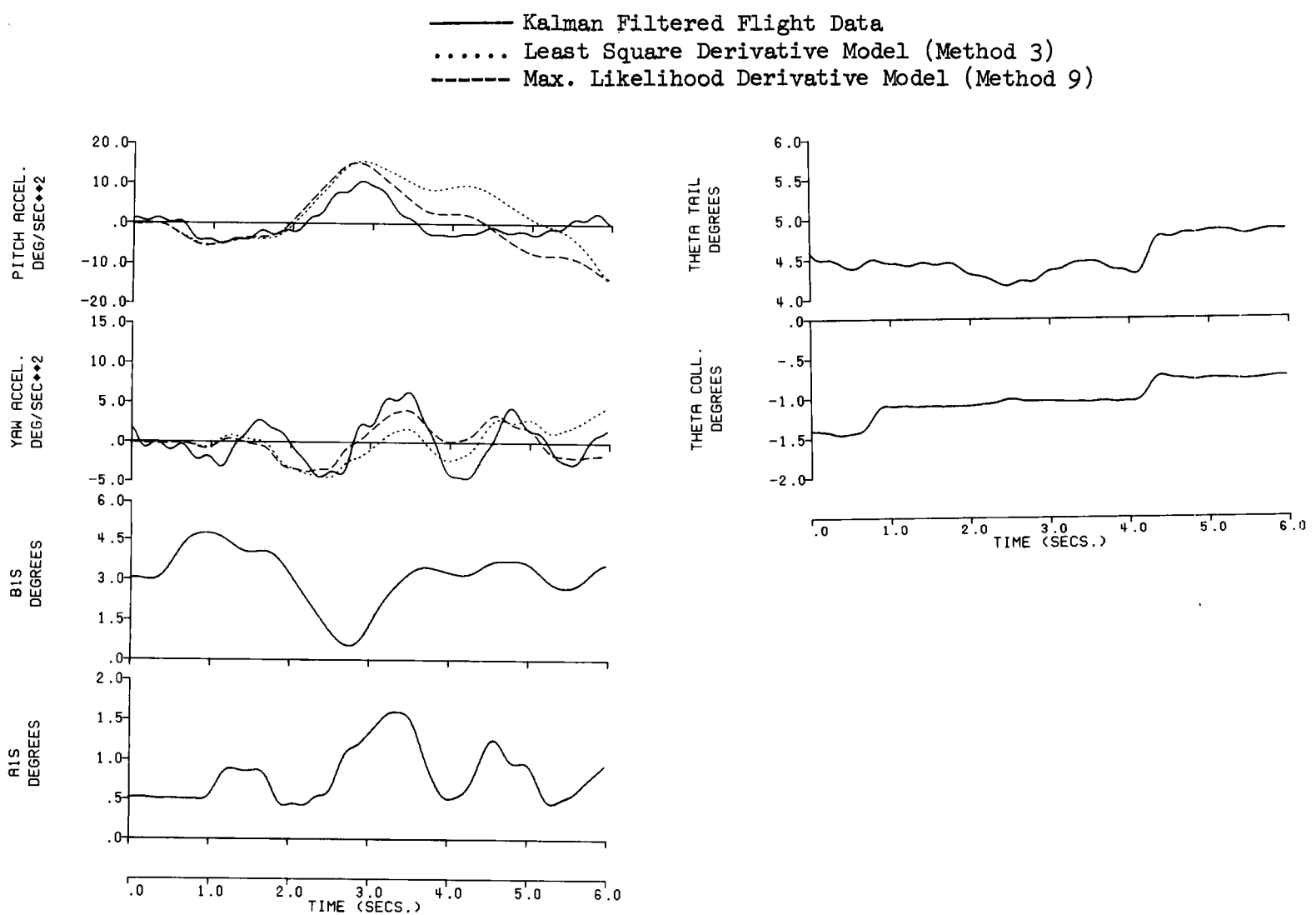

Figure 66. - Concluded.

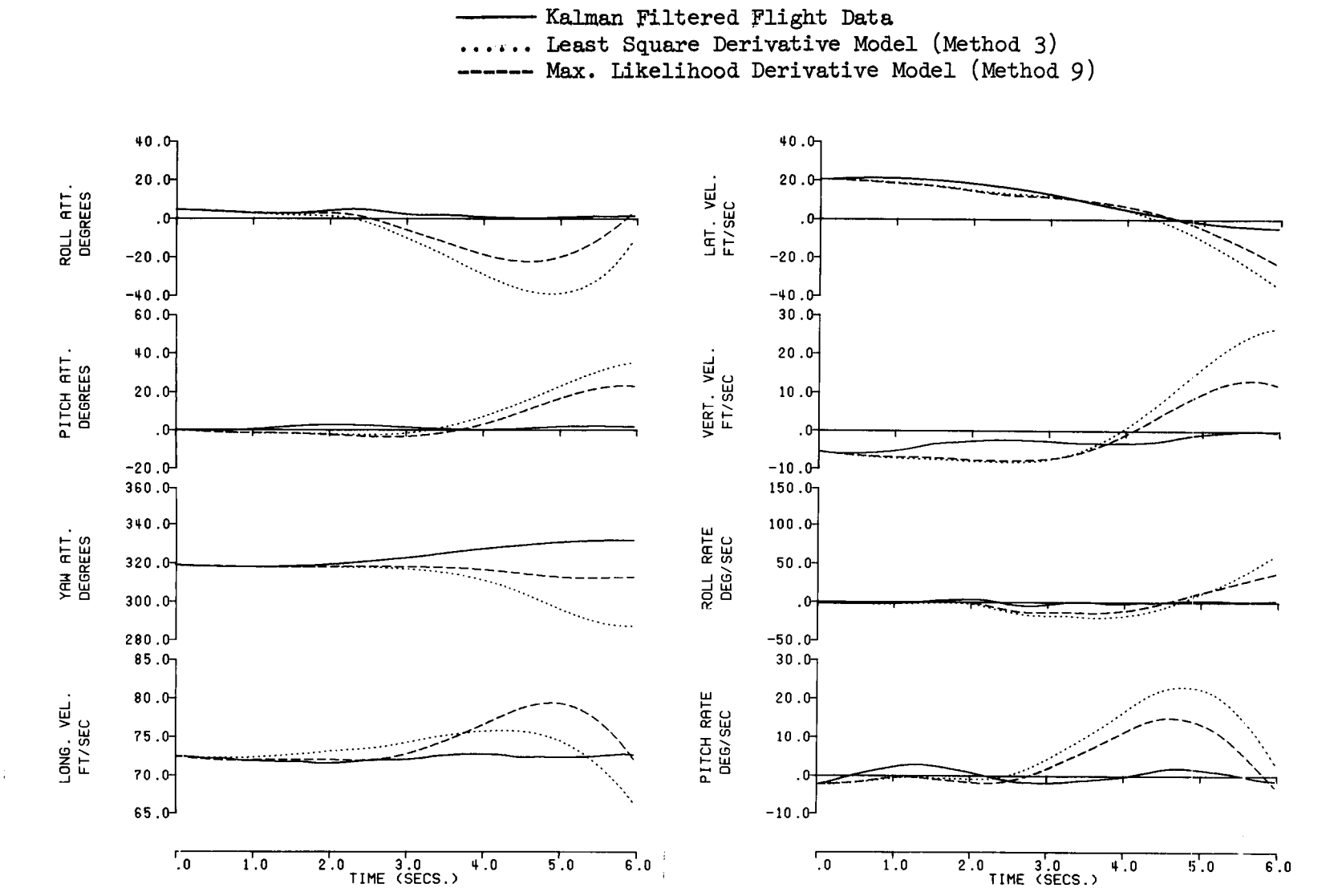

Figure 67. - Time History Comparison of Identified Derivative Models Against CH-54B Flight Data (45 knots, Maneuver 4).

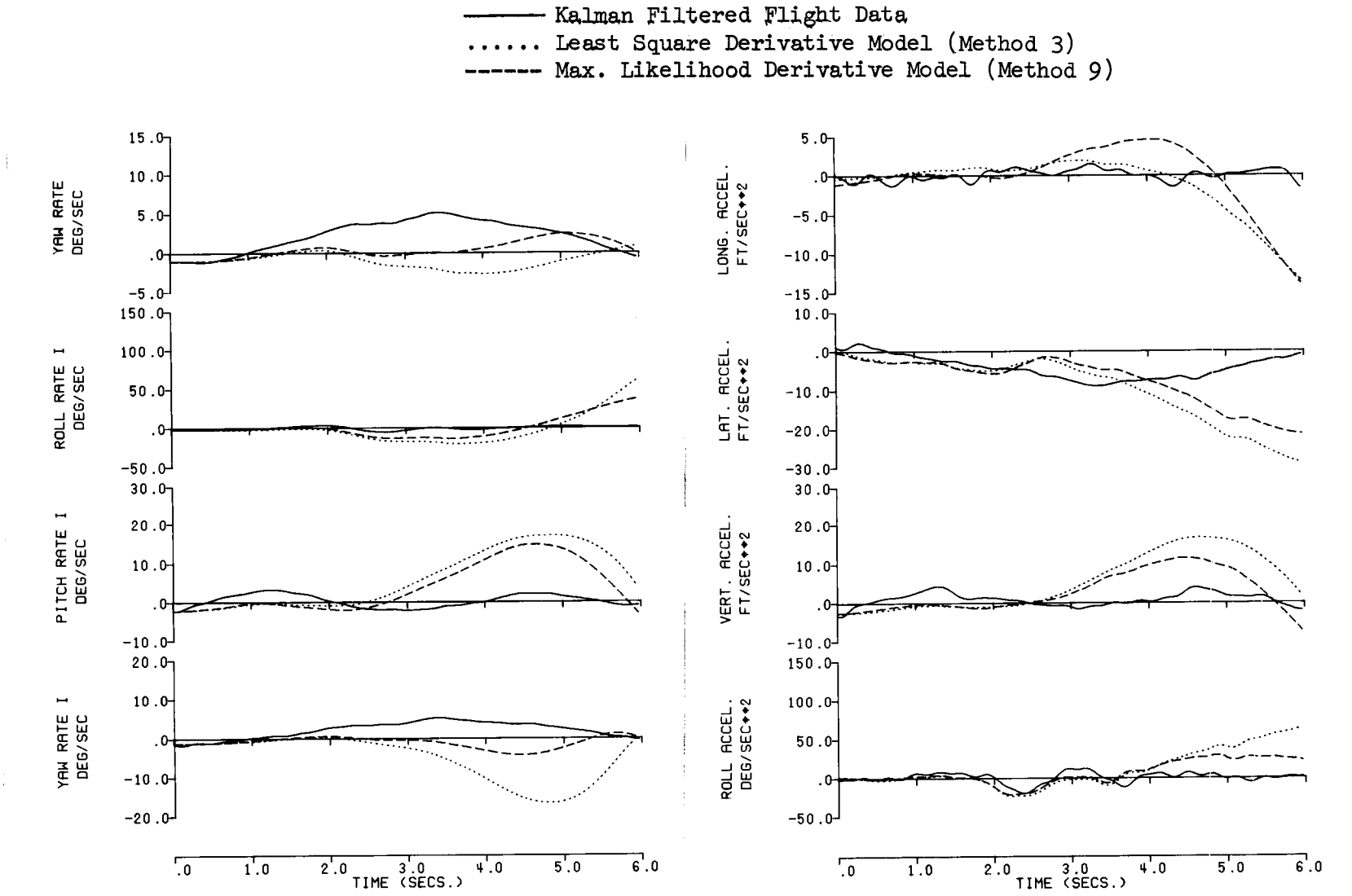

Figure 67. - Continued.

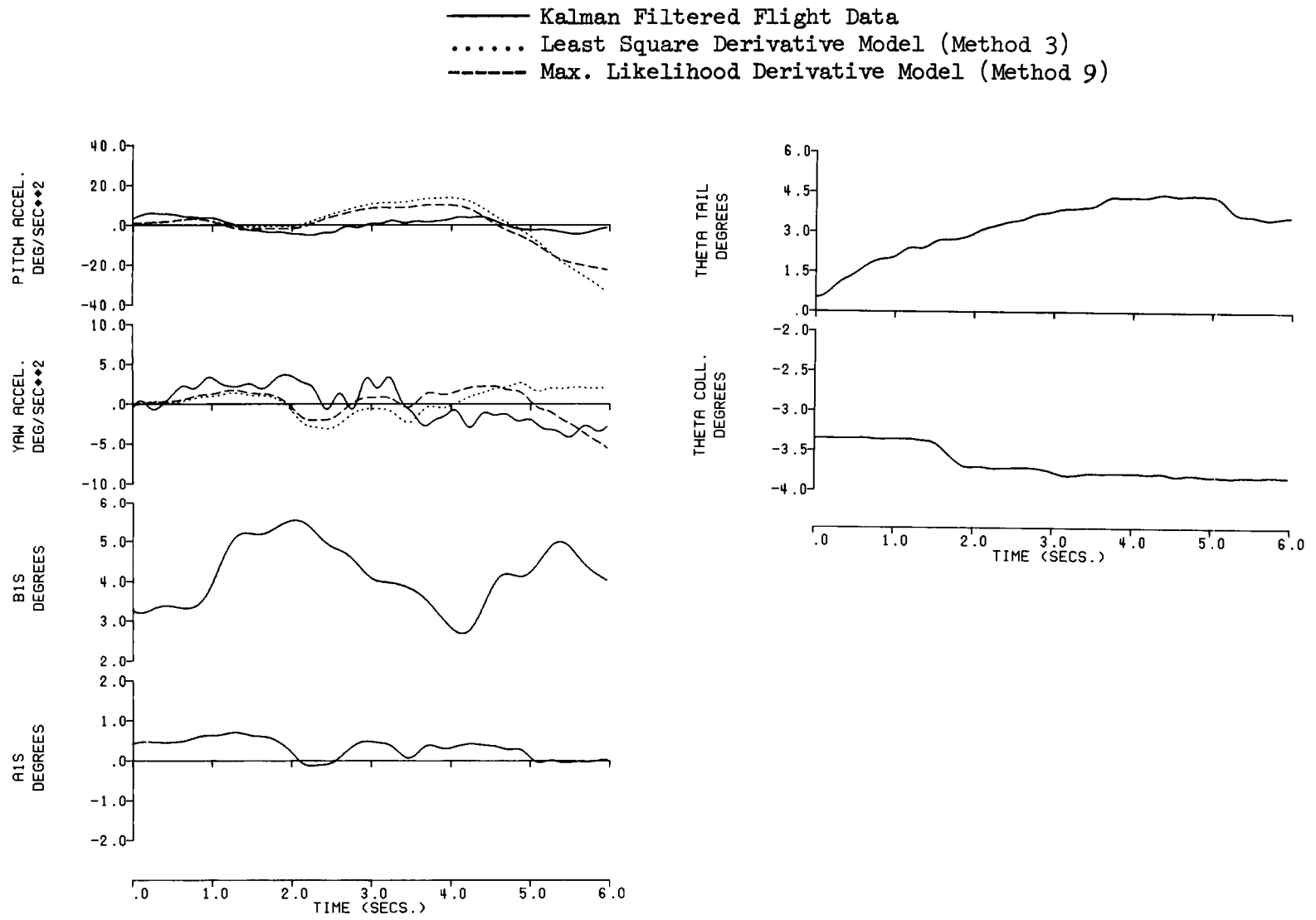

Figure 67 . - Concluded.

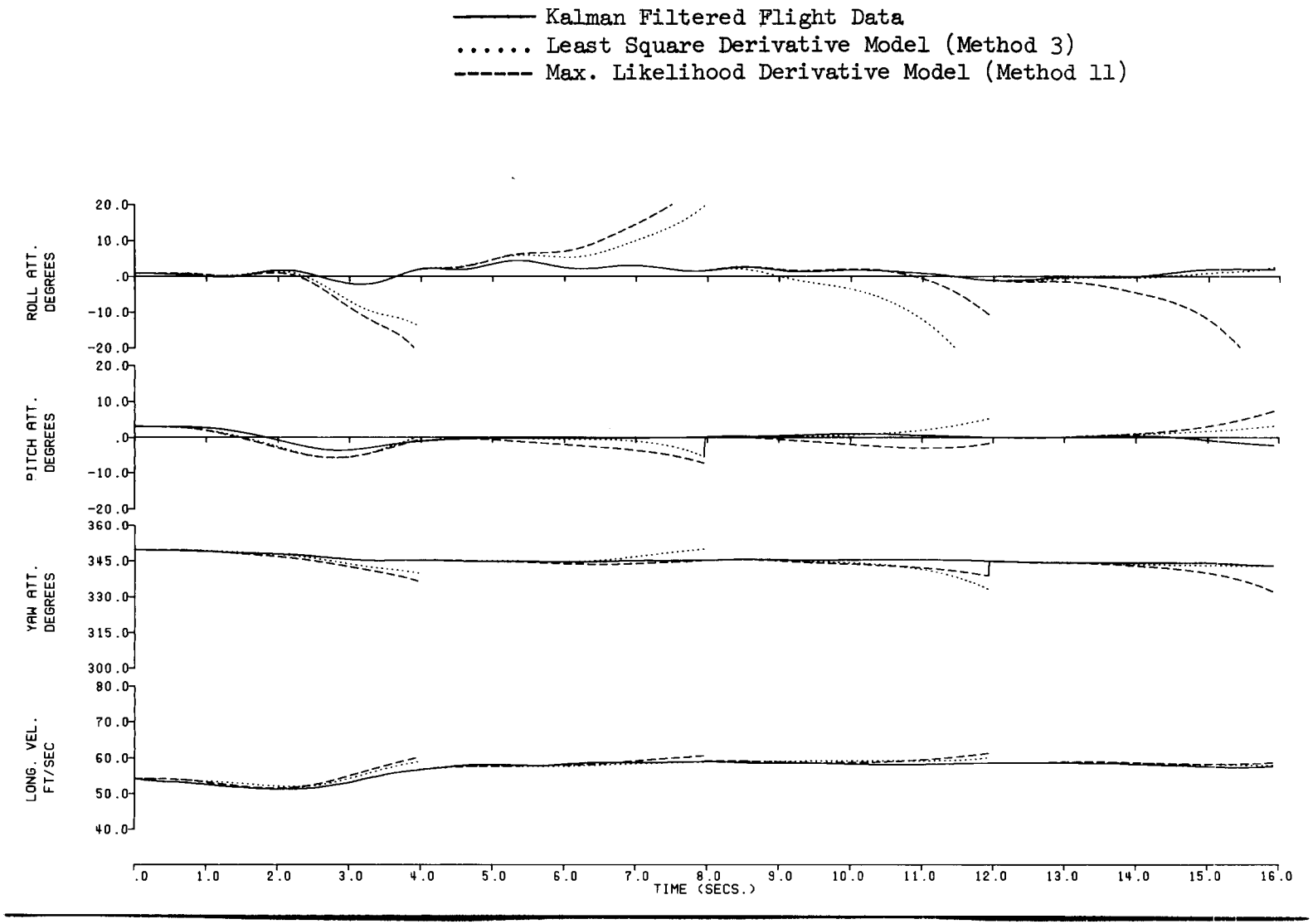

Figure 68. - Time History Comparison of Identified Derivative Models Against CH-54B Flight Data (45 knots, 16 sec. Maneuver).

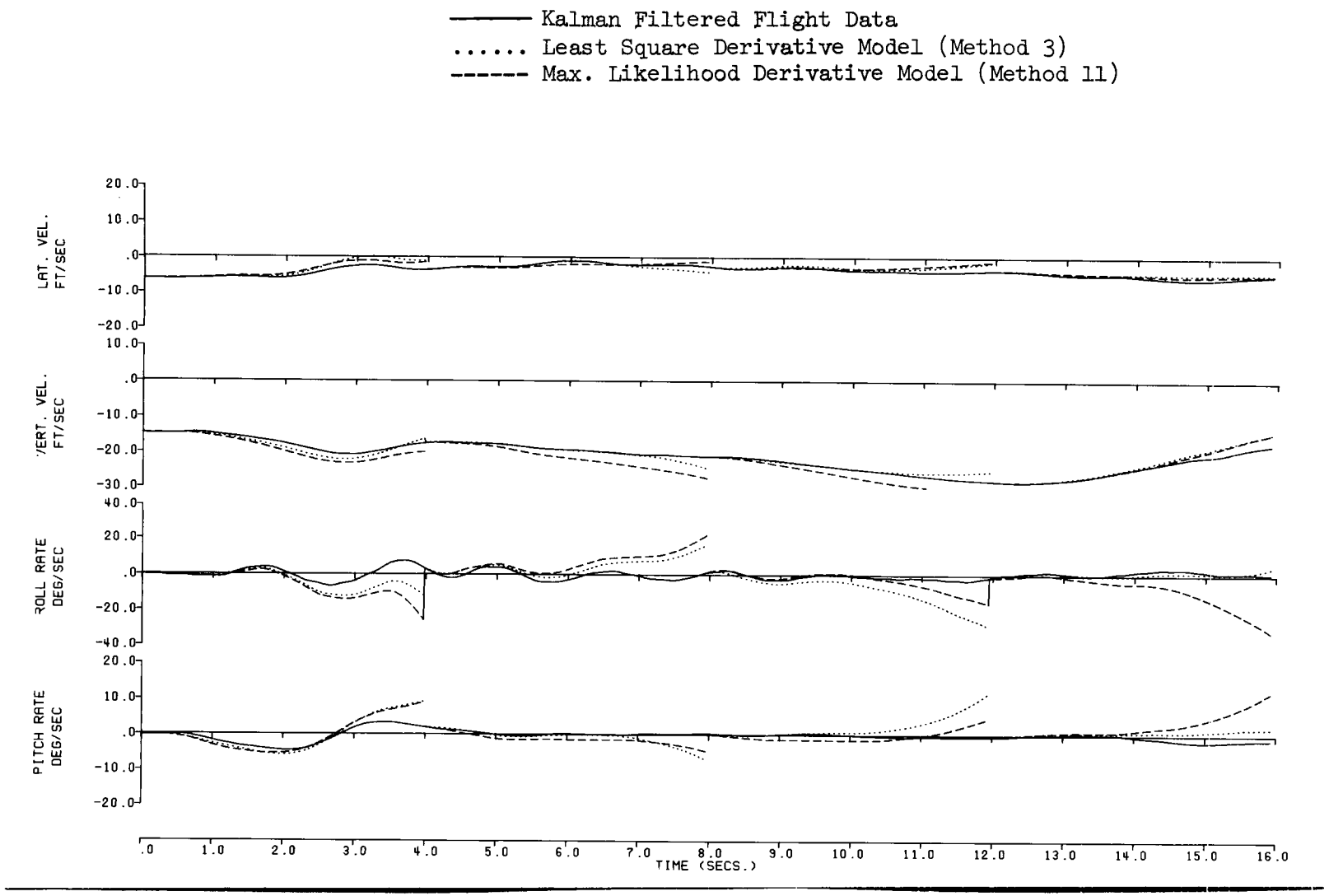

Figure 68. - Continued.

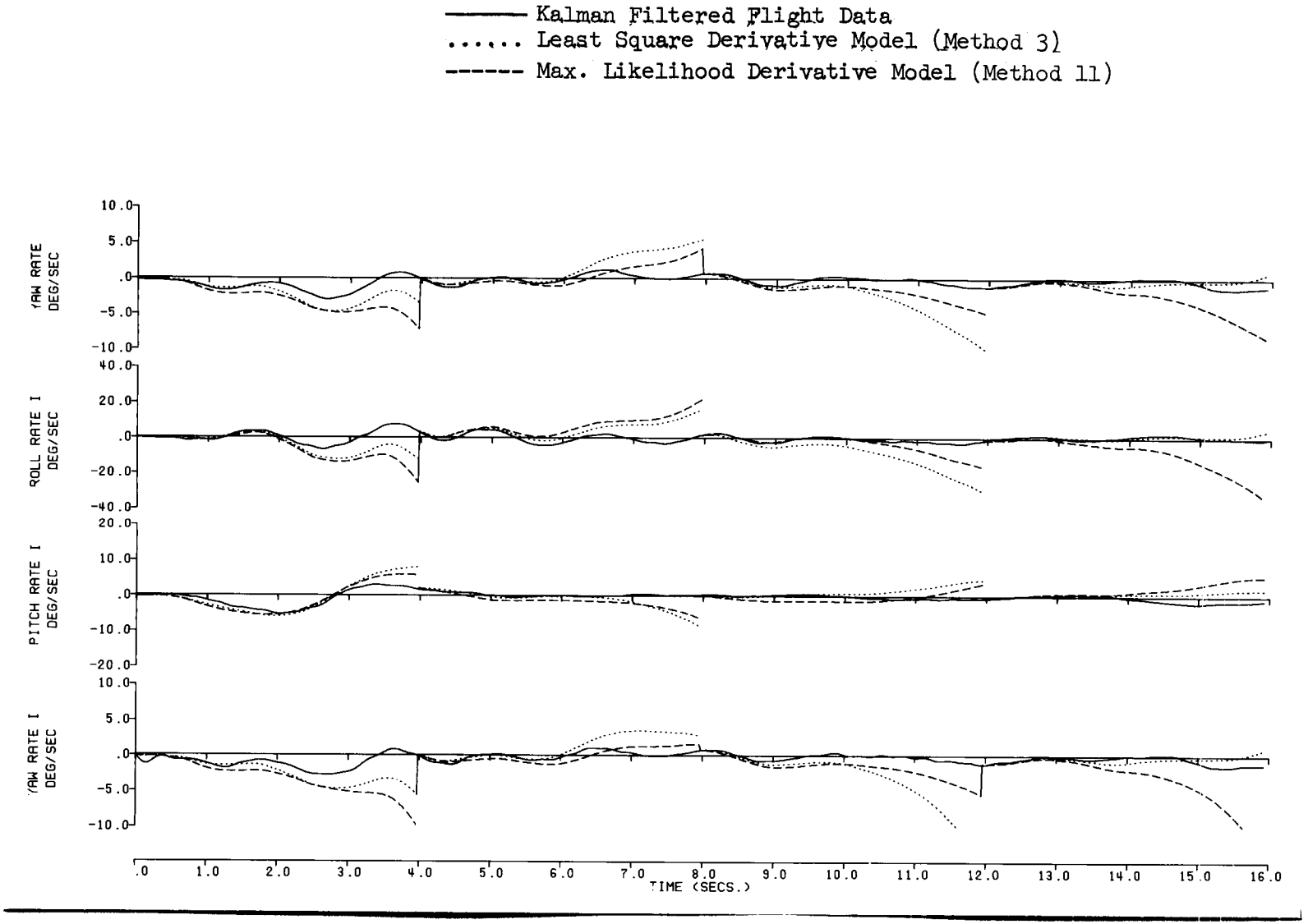

Figure 68. - Continued.

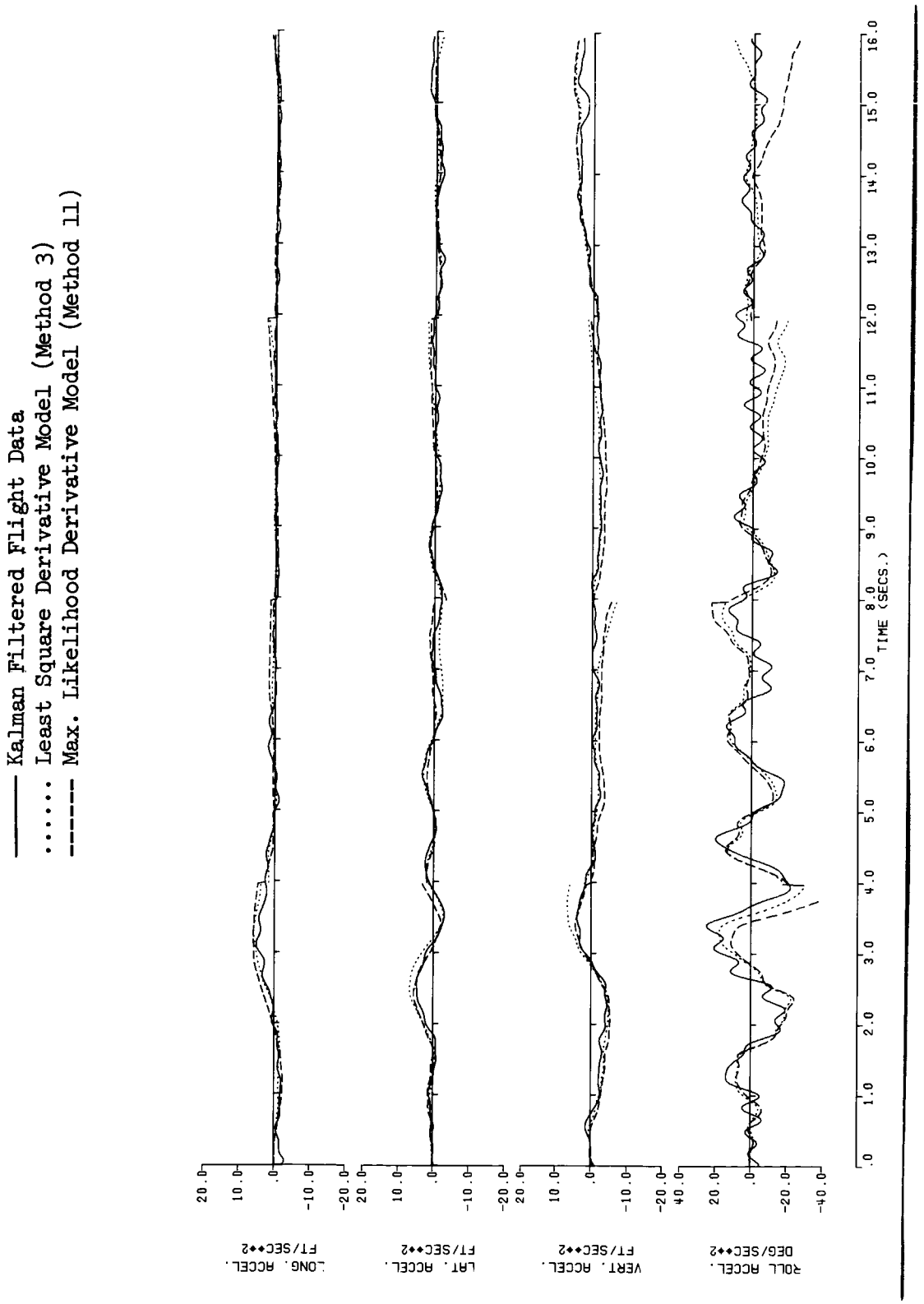

Figure 68. - Continued.

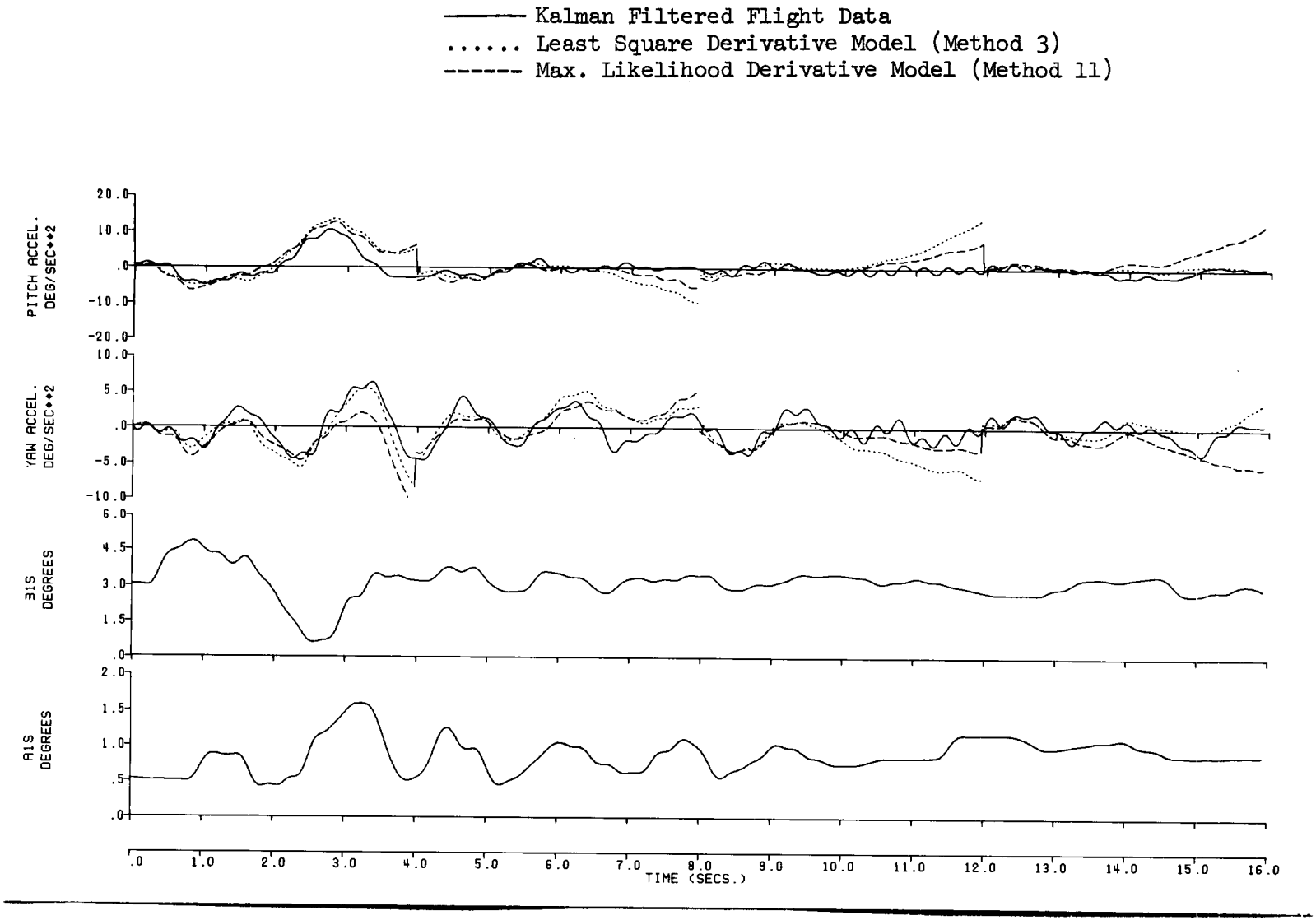

Figure 68. - Continued.

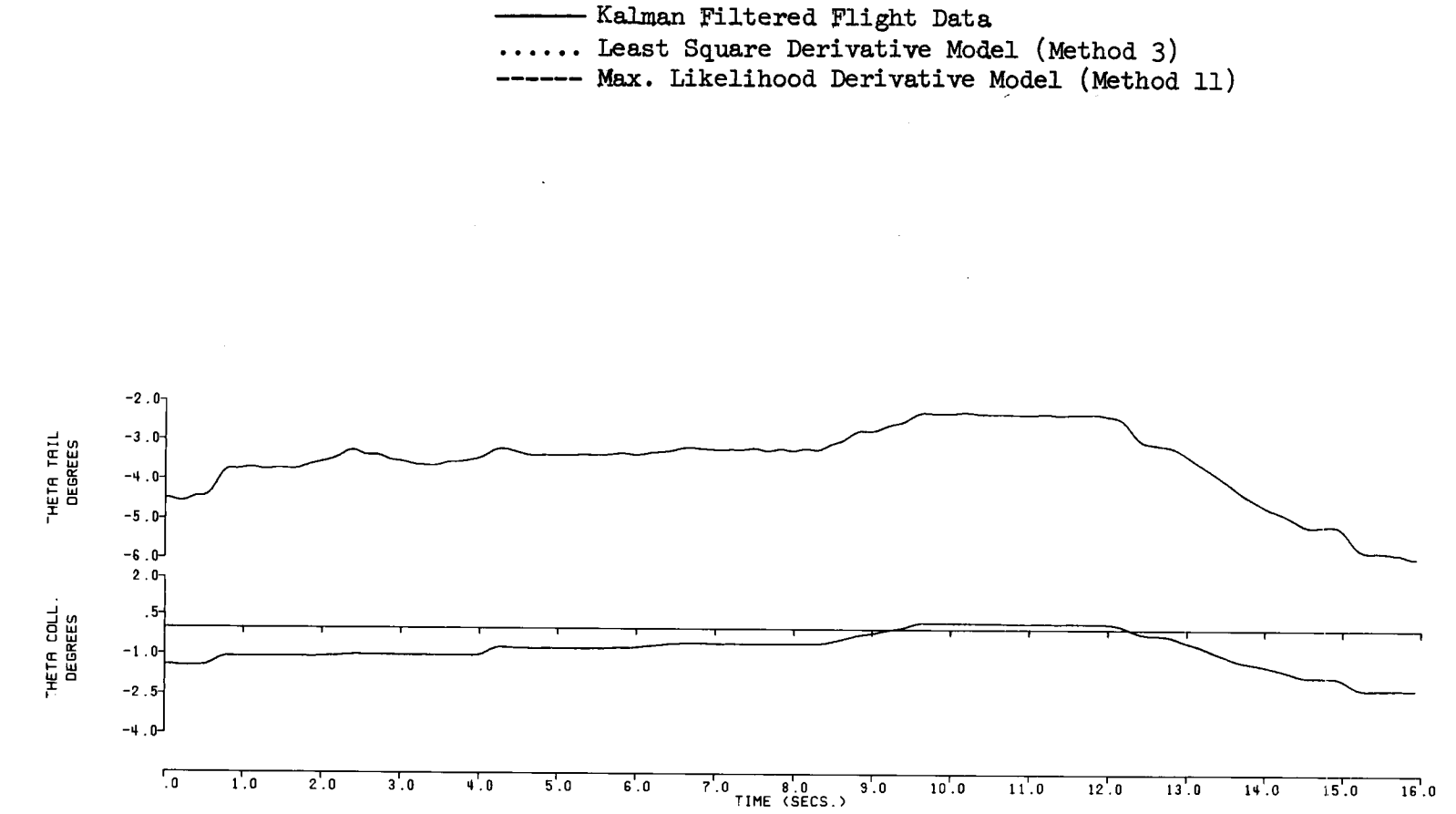

Figure 68. - Concluded.