

LineUp With Math™

Math-Based Decisions in Air Traffic Control

Student Workbook C

- **Resolving Air Traffic Conflicts by Changing Route**
 - **3 planes**, each at the same speed.
 - Simulator problems 3-1, 3-2

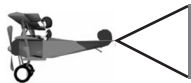


Simulator at: <https://atcsim.nasa.gov/simulator/sim2/sector33.html>



Investigator: _____

An Airspace Systems
Program Product

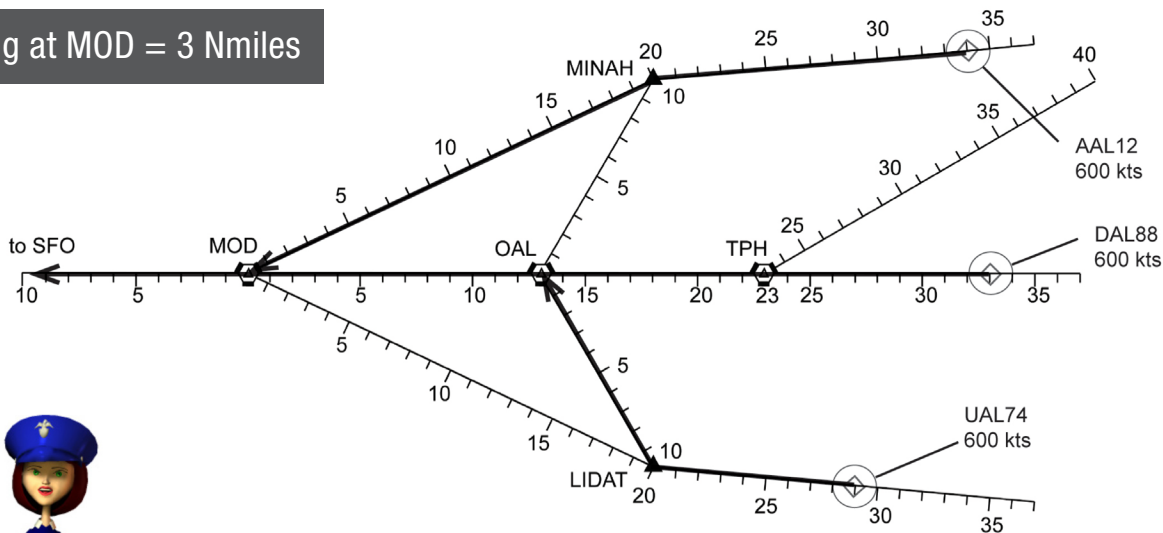


Problem 3-1



Investigator: _____

Ideal Spacing at MOD = 3 Nmiles

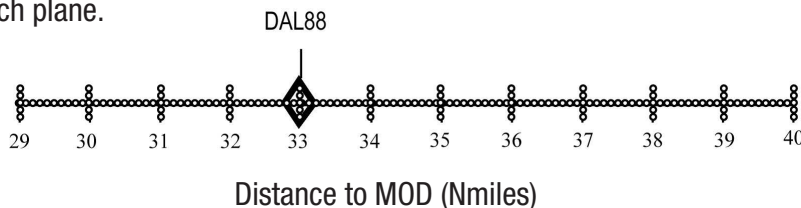


All 3 planes are flying to SFO.



1

- Use the flight plans to find each plane's travel distance to MOD.
- On the line below, use a \diamond to plot the travel distance to MOD for each plane.
- Label each plane.



2

To fill in the table below:

- Use your plot to figure out the arrival order and spacing at MOD.
- See if any spacing is less than minimum.
- See if extra spacing is needed to get the Ideal Spacing.

Arrival Order at MOD:	1st	2nd	3rd
Plane Call Sign	<input type="text"/>	<input type="text"/>	<input type="text"/>
Spacing at MOD	<input type="text"/> Nmi	<input type="text"/> Nmi	
Spacing at MOD	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	
Spacing at MOD	<input type="text"/> Nmi	<input type="text"/> Nmi	



3

What route changes would you make to solve any spacing problems?

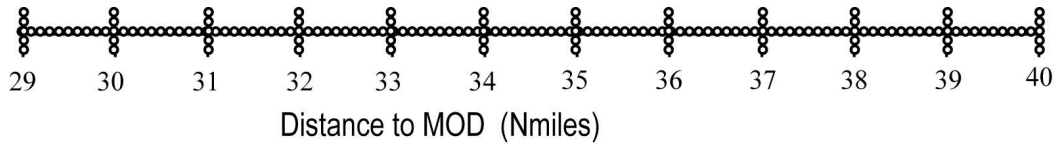
Arrival Order	Plane	New Route (if needed)	New Distance to MOD	New Spacing at MOD
1st	<input type="text"/>	<input type="text"/>	<input type="text"/> Nmi	<input type="text"/> Nmi
2nd	<input type="text"/>	<input type="text"/>	<input type="text"/> Nmi	<input type="text"/> Nmi
3rd	<input type="text"/>	<input type="text"/>	<input type="text"/> Nmi	

CAUTION

Be sure to mark out any old routes you've changed and darken the new routes.

4

To picture the NEW arrival order and spacing, use a to plot the new distances to MOD for each plane on the line below. Label each plane.



5

With your new routes, are the spacings at least the Minimum Spacing (2 nautical miles)?

No Yes

If No, try again.



6

With your new routes, are the spacings equal to the Ideal Spacing (3 nautical miles)?

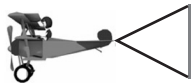
No Yes

7

If No, what could the controller do to make the spacing ideal?

End of Worksheet



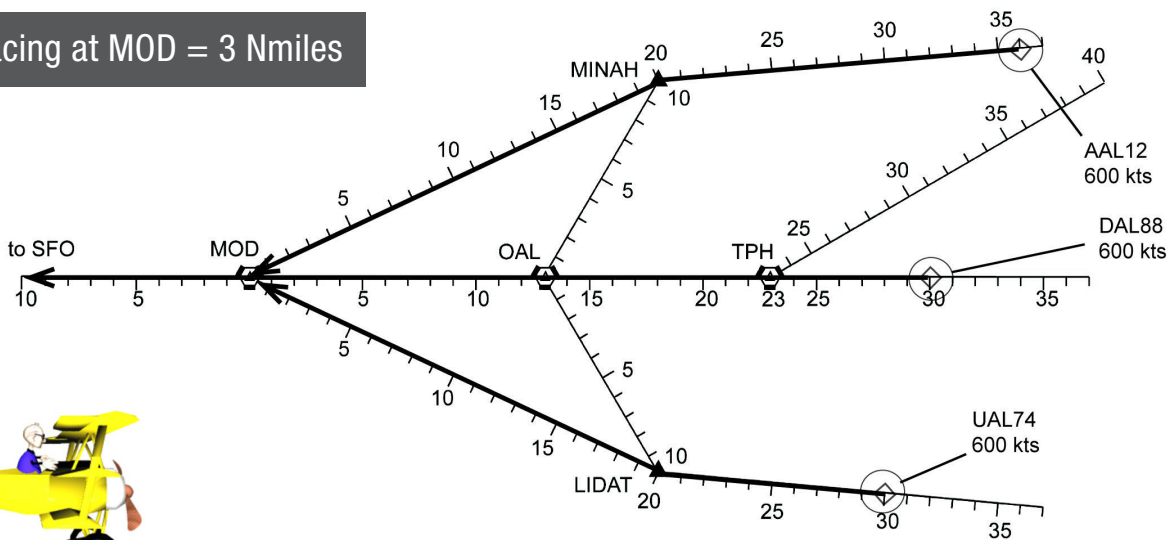
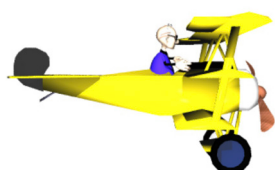


Problem 3-2



Investigator: _____

Ideal Spacing at MOD = 3 Nmiles



1

- Use the flight plans to find each plane's travel distance to MOD.
- On the line below, use a \diamond to plot the travel distance to MOD for each plane.
- Label each plane.



2

Are all the spacings at least the Minimum Separation? No Yes

3

Which plane needs extra spacing to have ideal spacing?

4

How much extra spacing is needed? nautical miles

5

On the route diagram, show how you would reroute traffic to try to achieve the Ideal Spacing.

CAUTION

Be sure to mark out the old route and darken the new route.

6

On the line in Question 1, use a \square to plot any NEW distances to MOD and cross out the old diamond for the old distance. Be sure to label each box with the plane's call sign.

7

Are all spacings now ideal? No Yes

If yes, Congratulations!

End of Worksheet

