



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: www.atcsim.nasa.gov



United 74 cleared
Coaldale to Modesto.

Investigator: _____

An Airspace Systems
Program Product

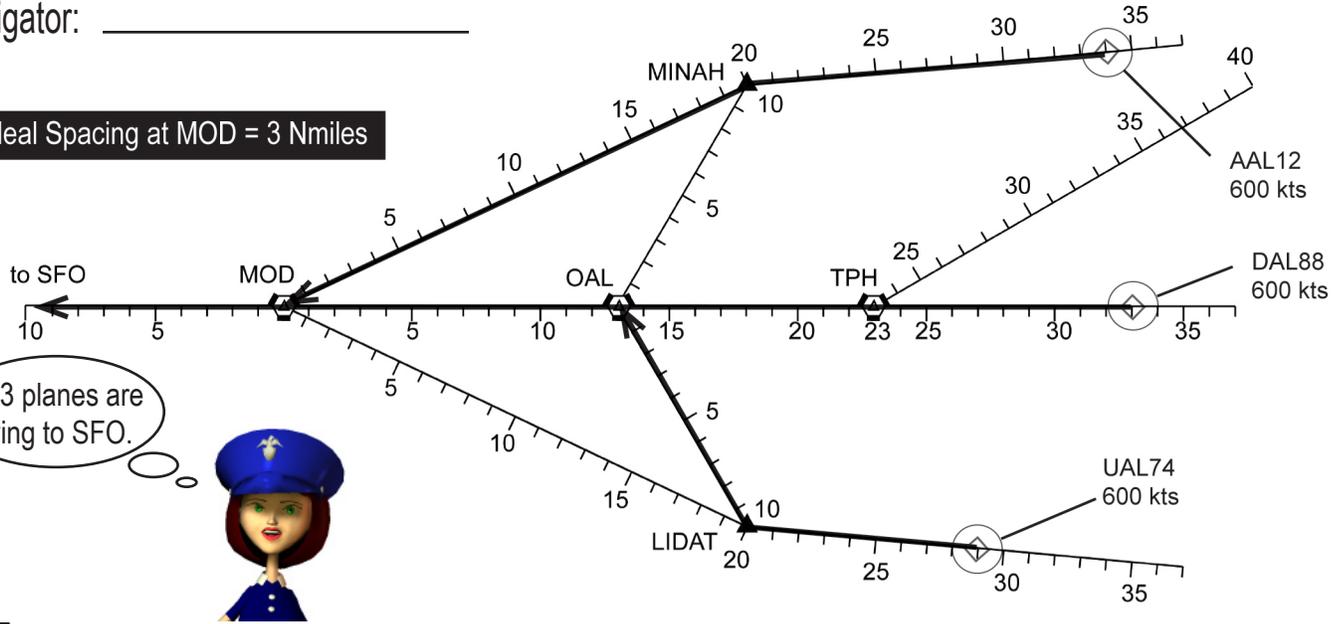


Problem 3-1



Investigator: _____

Ideal Spacing at MOD = 3 Nmiles

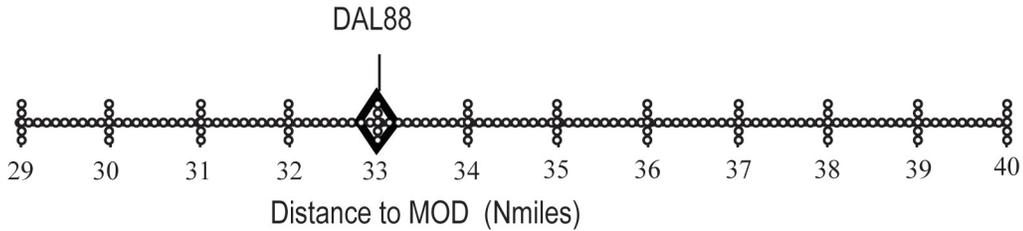


All 3 planes are flying to SFO.



1

- Use the flight plans to find each plane's travel distance to MOD.
- On the line below, use a  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 the 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
Is spacing at least the 2 Nmi minimum?	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	
Extra spacing needed for 3 Nmi ideal	<input type="text"/> Nmi		<input type="text"/> Nmi

Continue to Next Page

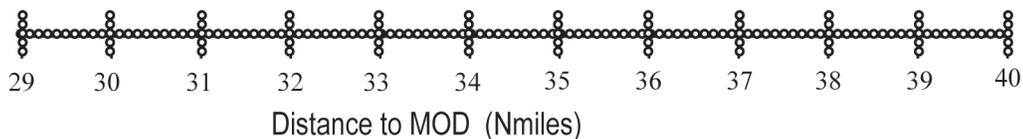


3 What route changes would you make to solve any spacing problems?

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	
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?

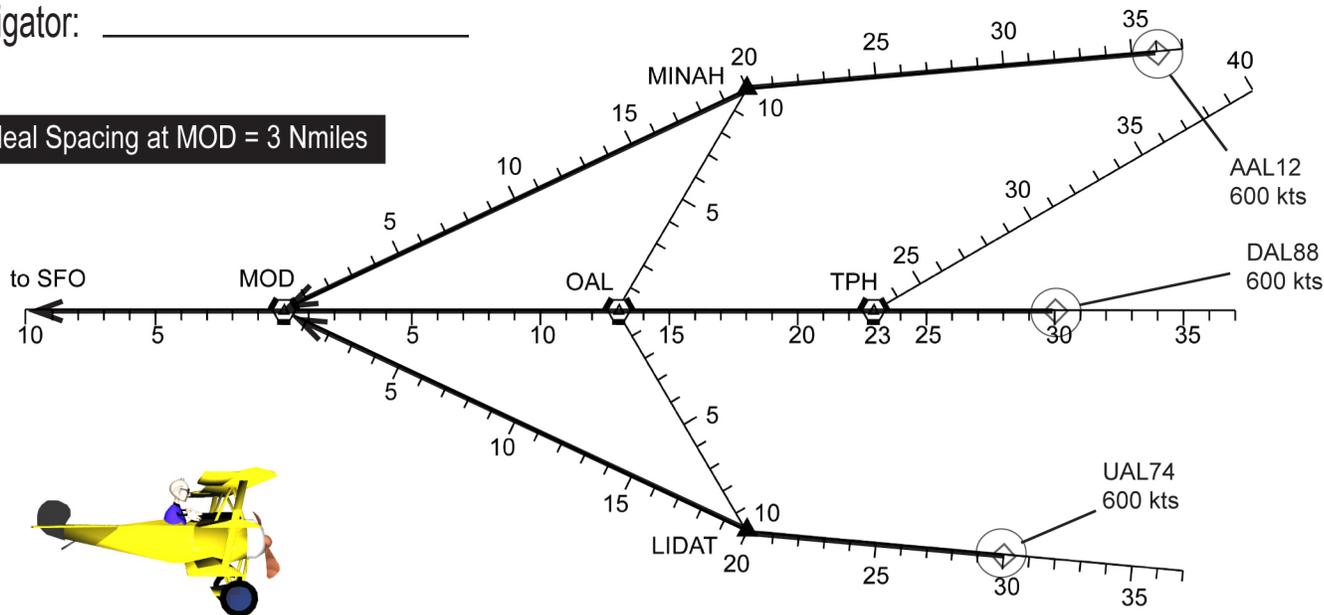
End of Worksheet

Problem 3-2

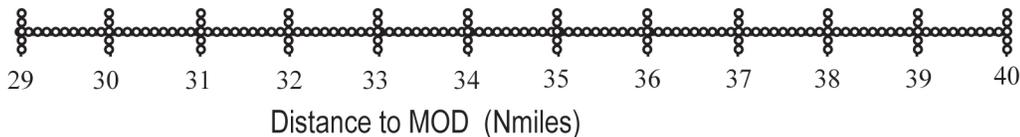


Investigator: _____

Ideal Spacing at MOD = 3 Nmiles



1 On the line below, use a  to plot the 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 any old routes you've changed and darken the new routes.

6 On the line in Question 1, use a  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

