Effect of ADSB on Near Mid-Air Collision Rates of GA Aircraft

Dr. Richard Theokas
Embry-Riddle Aeronautical University

Hypothesis

- ADS-B with supporting GBTs will result in a decrease in the number of aircraft near mid-air collisions at uncontrolled, non-towered airfields.
- Implications assessed for application to general aviation activity nationally.
- Implications regarding the effectiveness of ADS-B to decrease near mid-air collisions nationally may also be made.

Accomplished Tasks

- Harvested NMAC data for
  - Daytona Beach for the years 2000 thru 2003
  - Prescott for the years 1996 thru 2003
- Categorized NMAC events as occurring in one of three areas within a 50nm radius of subject airports (i.e. DAB and PRC)
  - Daytona Beach (completed analysis for the years 2000 thru 2003)
    - Practice Areas
    - Traffic Patterns (including 45 deg. dogleg to downwind)
    - Ground
  - Prescott
    - Practice Areas
    - Traffic Patterns (including 45 deg. dogleg to downwind)
    - Ground

Accomplished Tasks

- Analyzed actual number of reported NMAC frequencies, calculated rate of incidents per 100,000 flight hours
  - –Daytona Beach (for the years 2000 thru 2003)
    - •Completed by raw NMAC frequency per month/per year/per incident location
    - •Completed by NMAC frequency per 100,000 flight hours per month/per year/per incident location
  - –Prescott (for the years 1996 thru 2003)
    - •Completed by raw NMAC frequency per month/per year/per incident location
    - •Need flight hours for PRC from 1996 thru 2003 to proceed with analysis

Event Categories

Classification Table for Near Mid-Airs

Phase of Flight				Flight Rules
Practice Areas	**Traffic Patterns & 45 Degree Dogleg**	**Ground**	**Investigate Further**	
Generic Terms				
Cruise	Final	Parked	Other (key in)	VFR
	Crosswind	Preflight	Climb	IFR
	Short Final	Startup		
	Landing	Taxi Out		
	Pattern Entry	Rollout		
	Takeoff	Taxi Back		
	Downwind	Post Flight		
	Initial Climb	Takeoff Roll		
	Base			
User Defined Terms				
Clearing Turn	Approach	Holding Short	Descent	
Grnd Ref Maneuvers	Arrival/Approach	Other: Hold Short	Maneuvers	
Ground Ref. In Practice Fields	Closed Traffic		Other	
Holding	Departing Traffic Pattern		Other: BAI Maneuvers	
Inbound	Go Around		Other: Simulated Engine Failure	
Maneuvers in Practice Area	Missed Approach		Simulated Single Engine	
Slow Flight	Outbound			
Stalls	Upwind			
	Vectors to Final			
	VOR Approach			

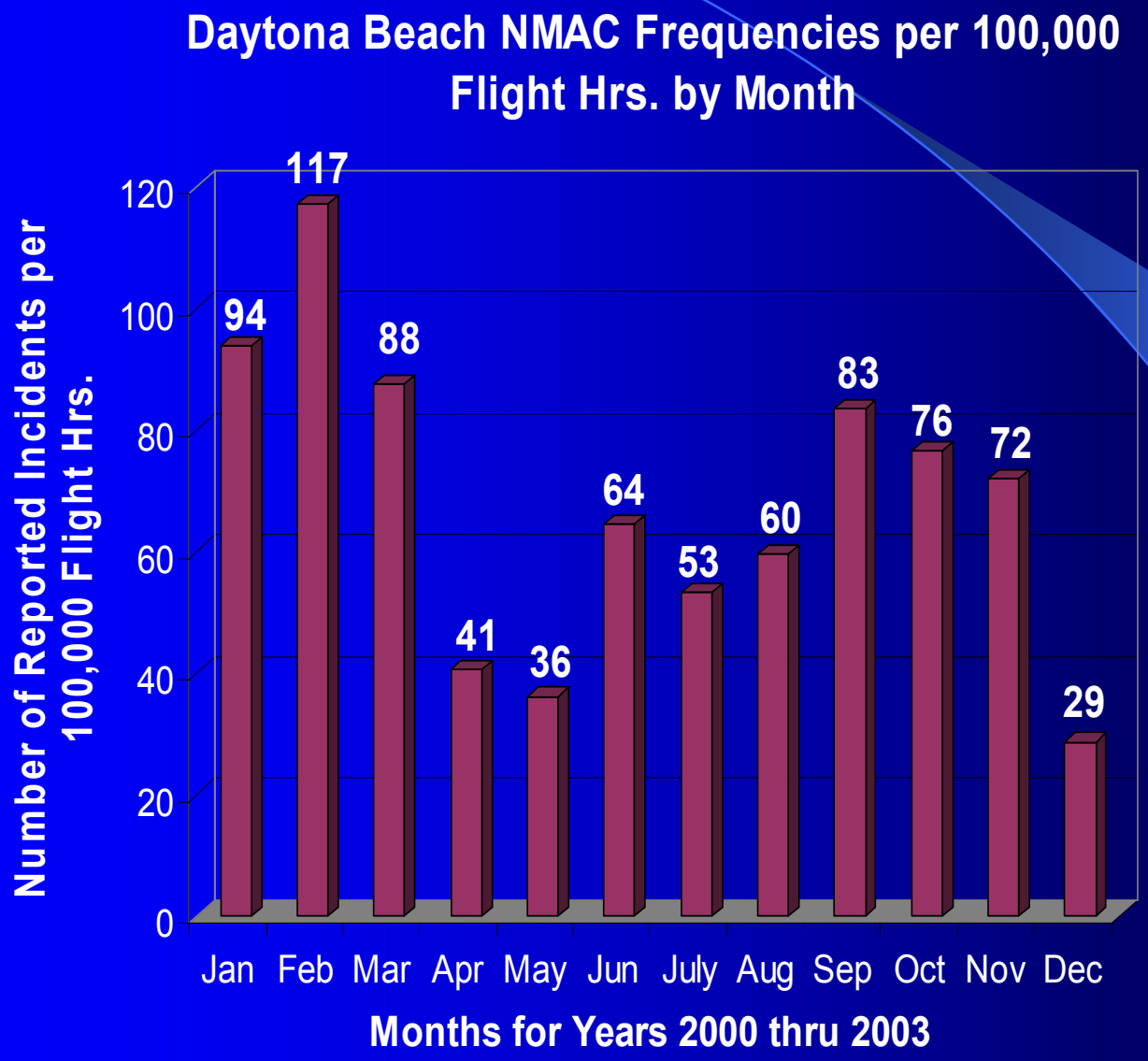
Tasks to be Accomplished

- Harvest NMAC data for
  - Daytona Beach for the years 1996 thru 1999
- Categorize NMAC events as occurring in one of three areas within a 50nm radius of the subject airports (i.e. DAB and PRC)
  - Daytona Beach (for the years 1996 thru 1999)
  - Prescott (complete task for the years 1996 thru 2003)

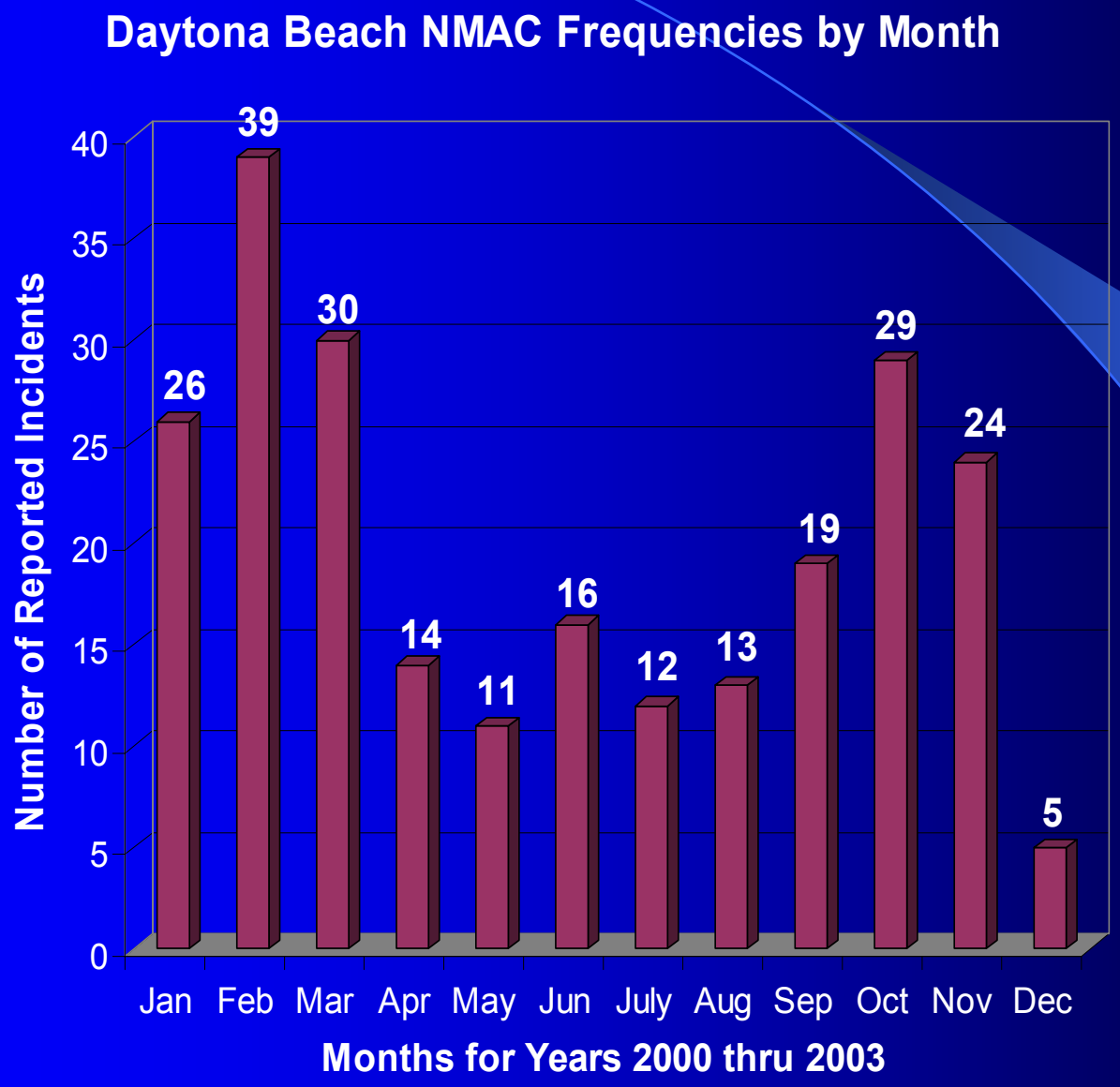
Tasks to be Accomplished

- Analyze number of reported NMAC frequencies, as well as by number of incidents per 100,000 flight hours
  - –Daytona Beach (for the years 1996 thru 1999)
    - •By raw NMAC frequency per month/per year/per incident location
    - •By NMAC frequency per 100,000 flight hours per month/per year/per incident location
  - –Prescott (for the years 1996 thru 2003)
    - •By NMAC frequency per 100,000 flight hours per month/per year/per incident location

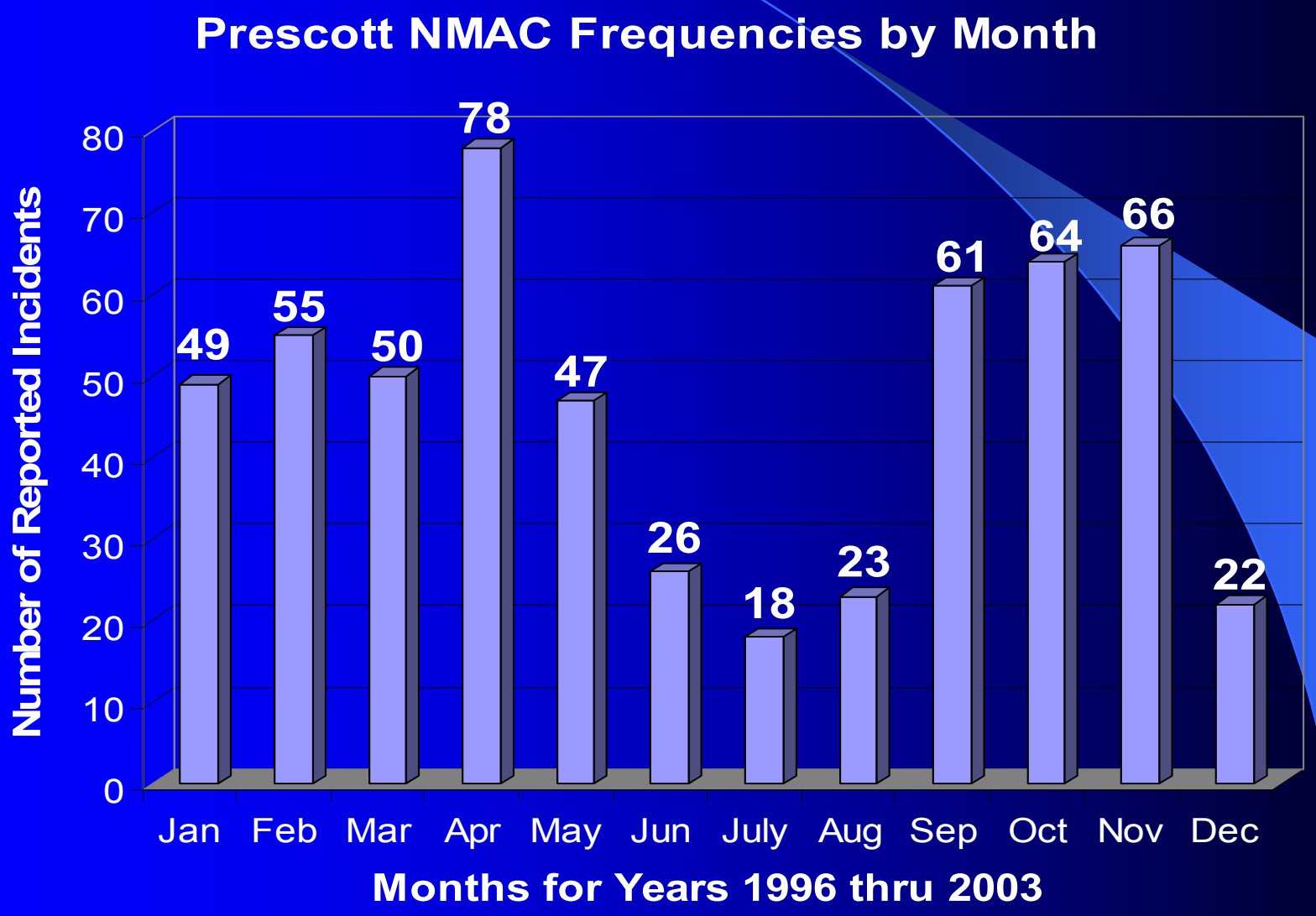
Daytona Beach



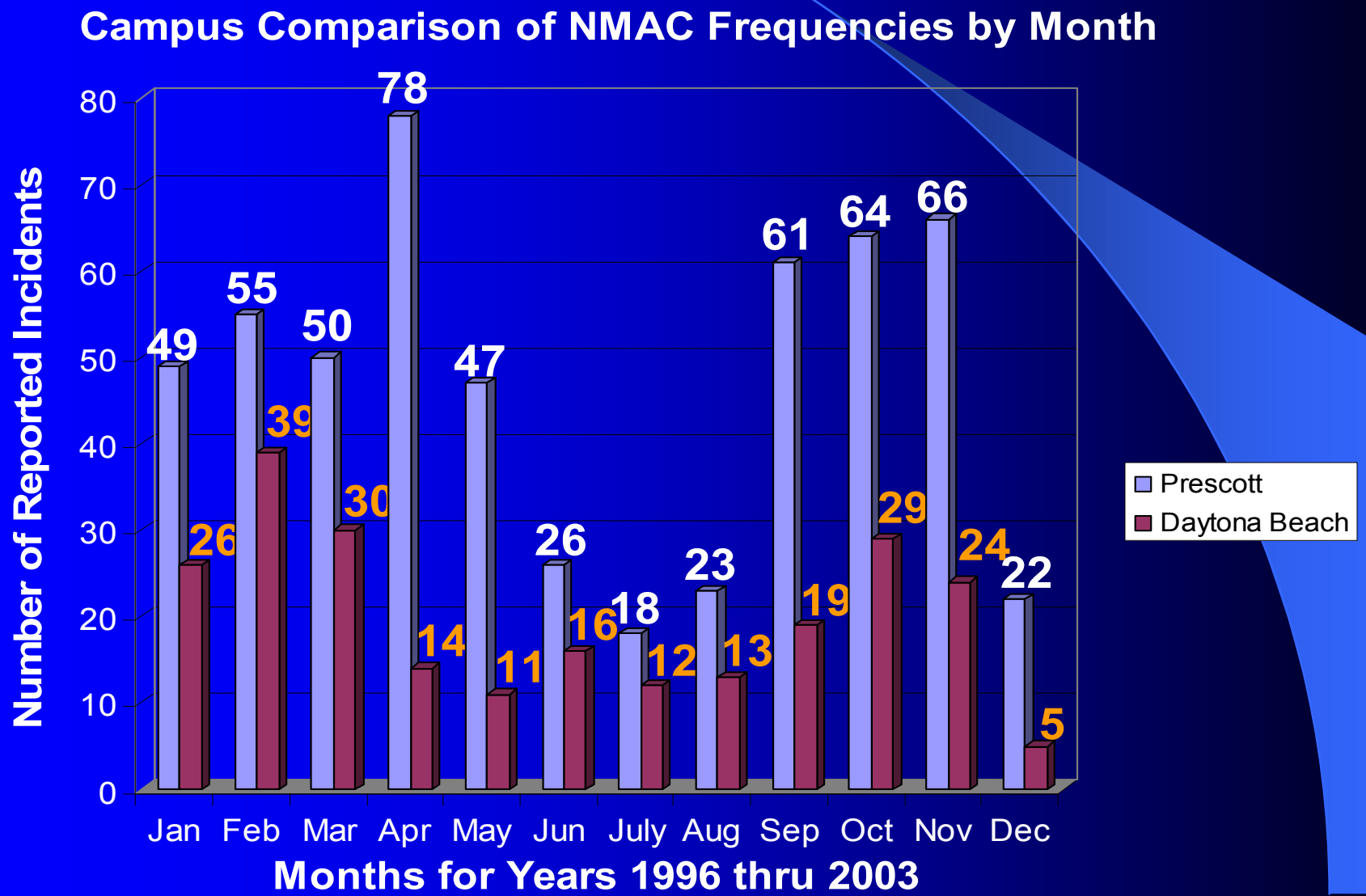
Daytona Beach



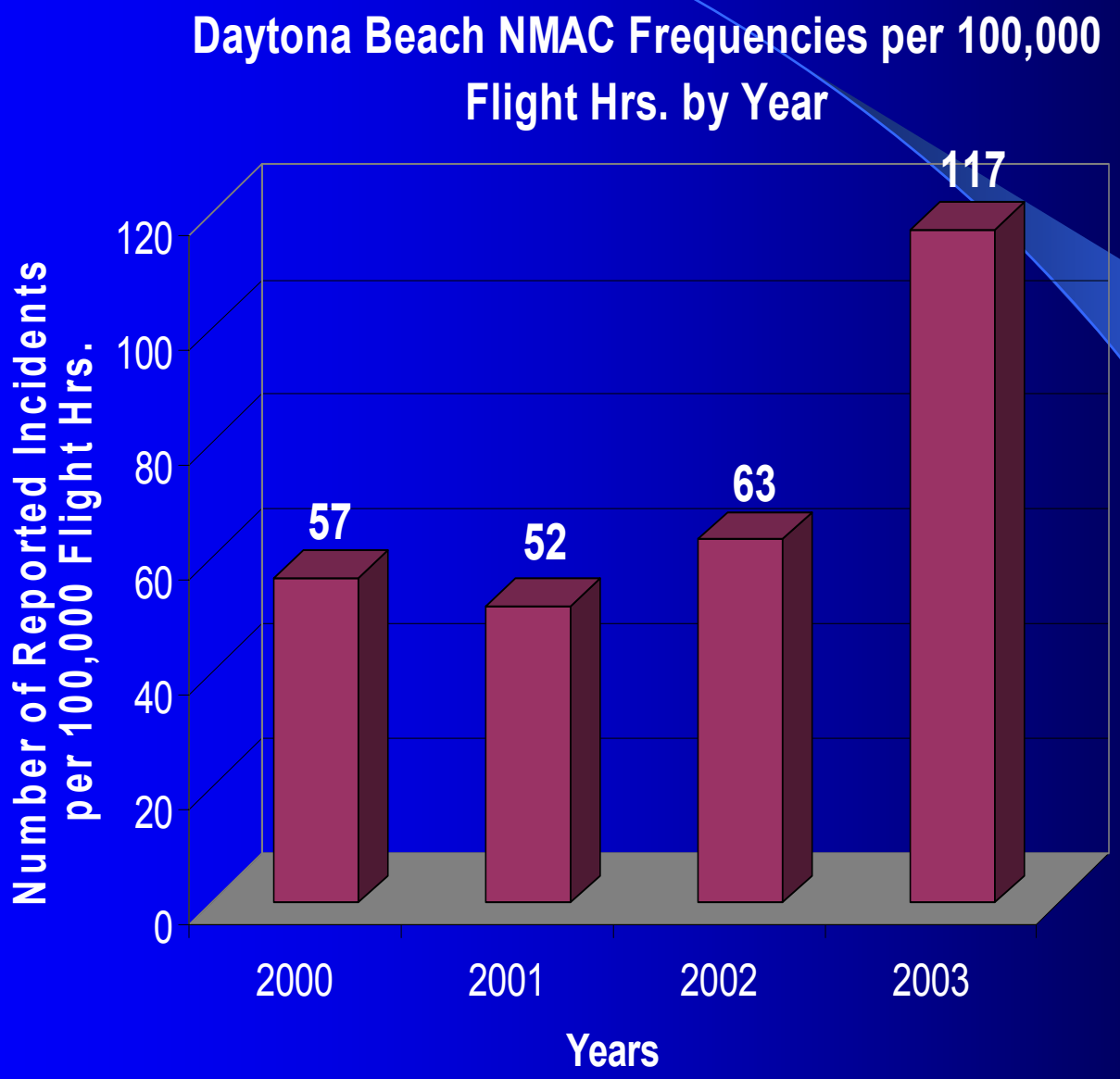
Prescott


Prescott NMAC Frequencies by Month
Number of Reported Incidents
0
10
20
30
40
50
60
70
80
49
55
50
78
47
26
18
23
61
64
66
22
Jan
Feb
Mar
Apr
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Months for Years 1996 thru 2003

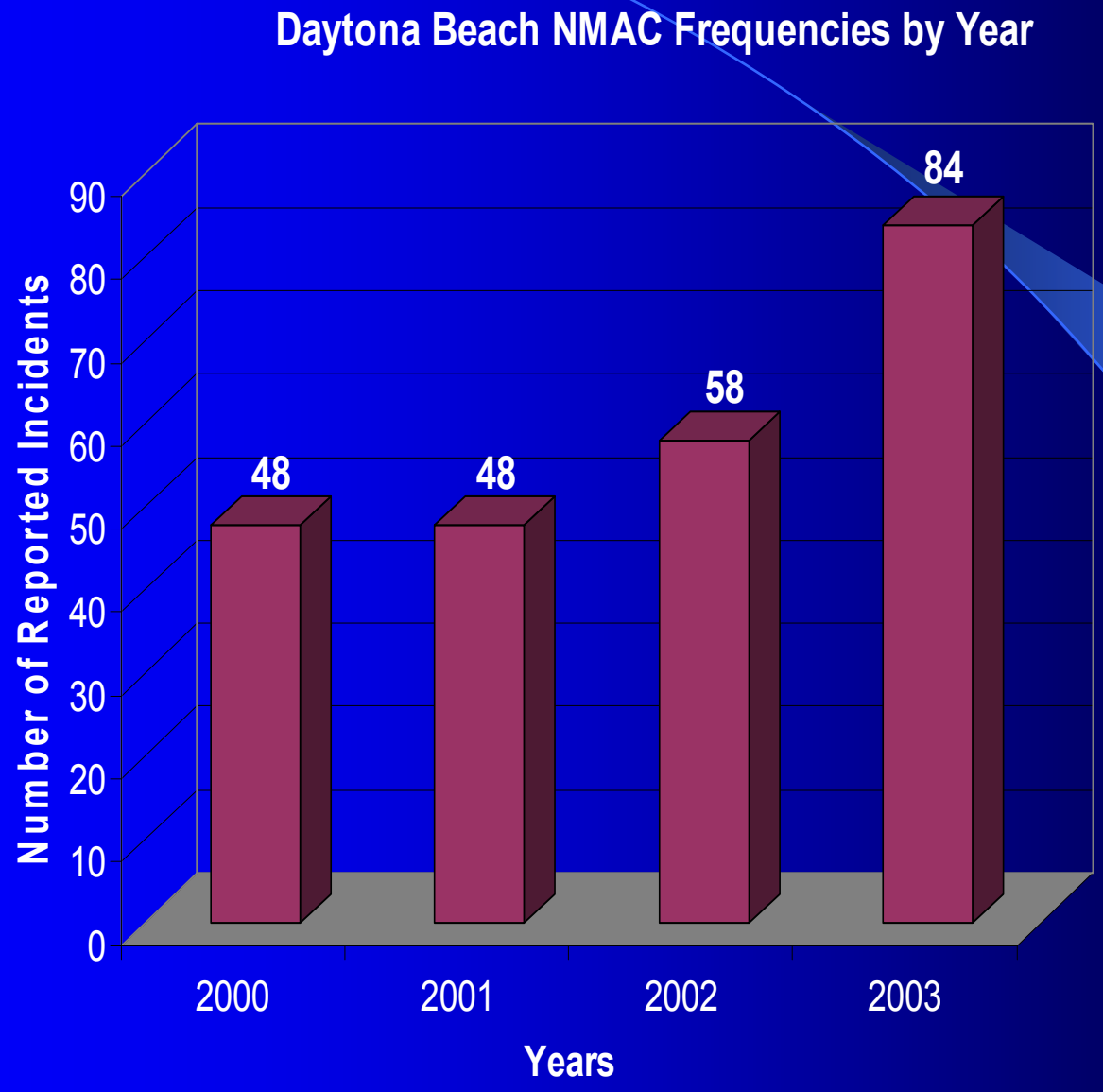
Prescott & Daytona Beach



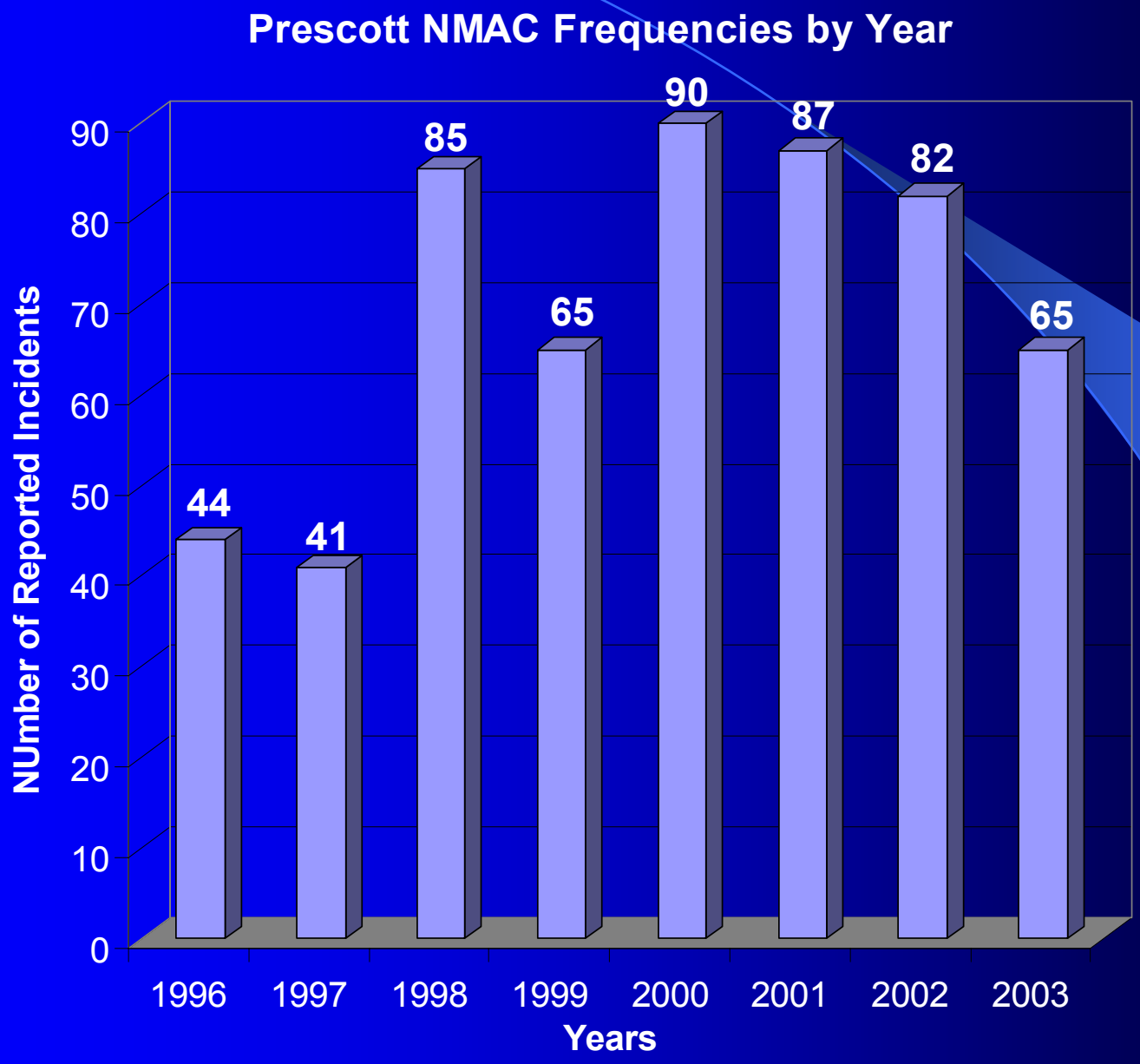
Daytona Beach



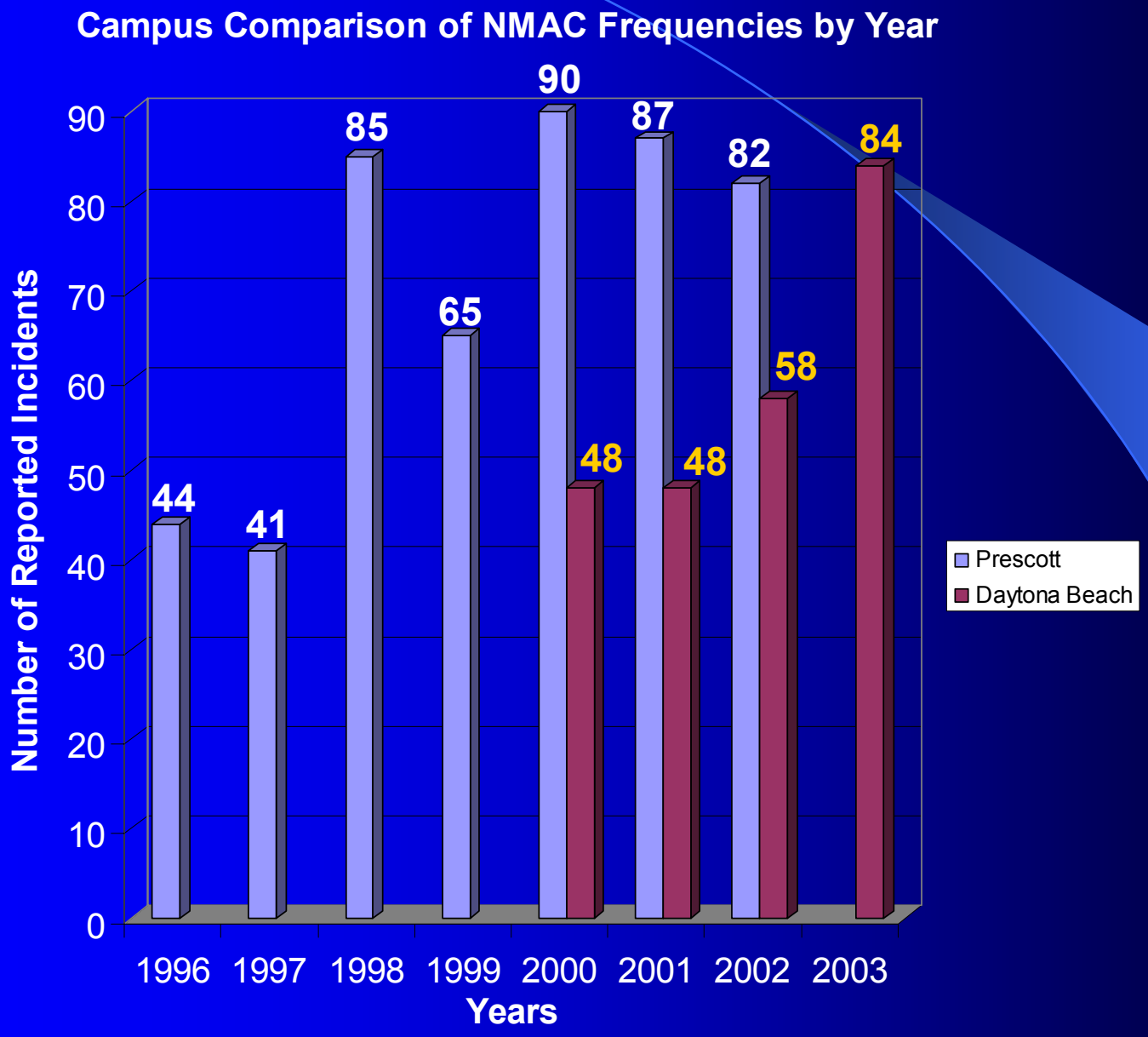
Daytona Beach



Prescott

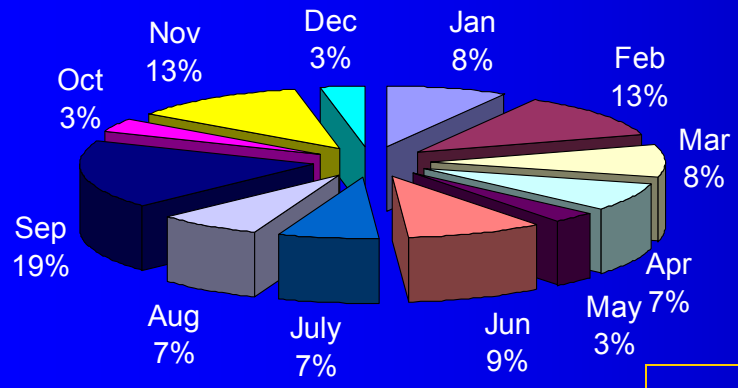

Prescott NMAC Frequencies by Year
NUmber of Reported Incidents
0
10
20
30
40
50
60
70
80
90
44
41
85
65
90
87
82
65
1996
1997
1998
1999
2000
2001
2002
2003
Years

Prescott & Daytona Beach

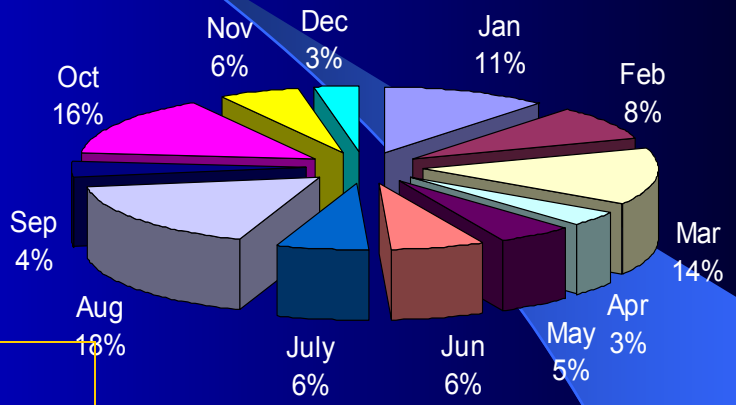


Daytona Beach

2000

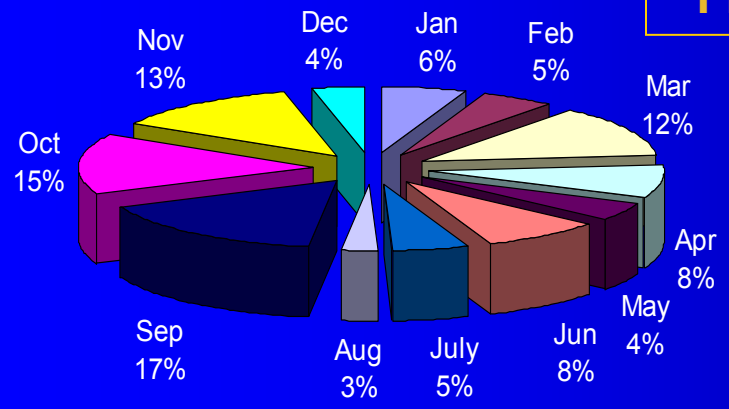


2001

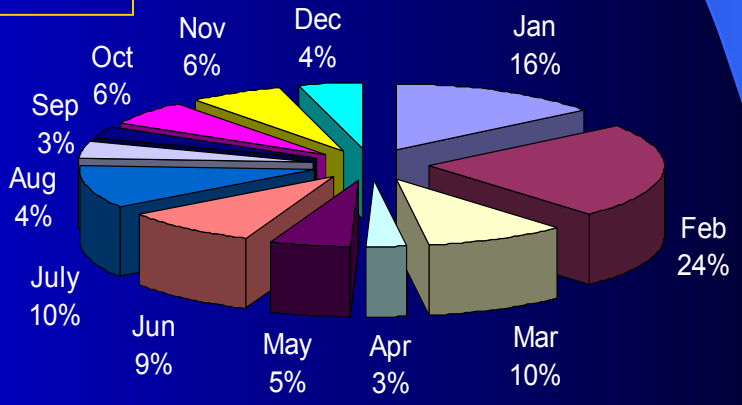


NMAC Frequencies per 100,000 Flight Hours

2002

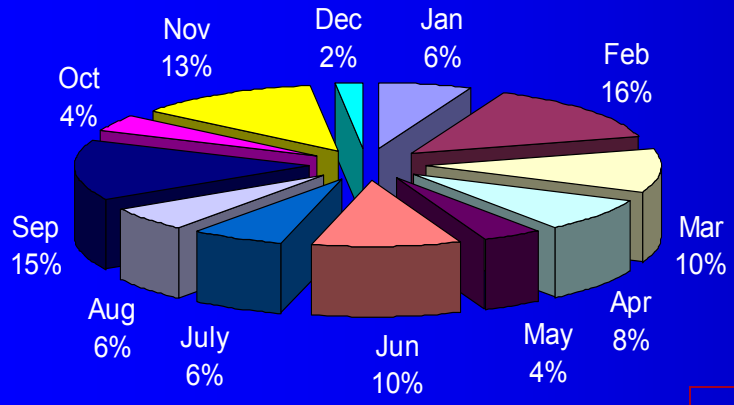


2003



Daytona Beach

2000



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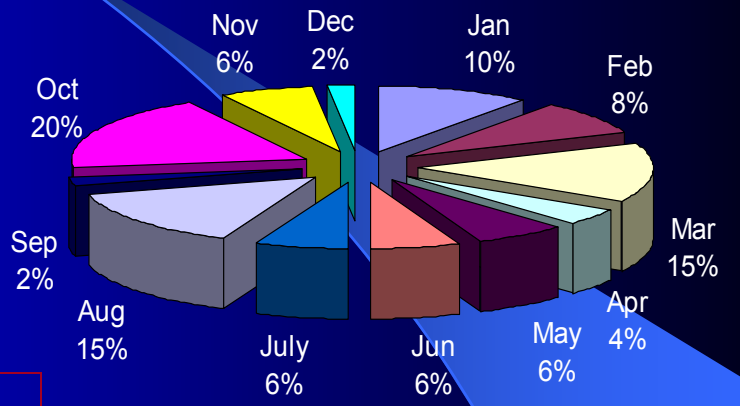
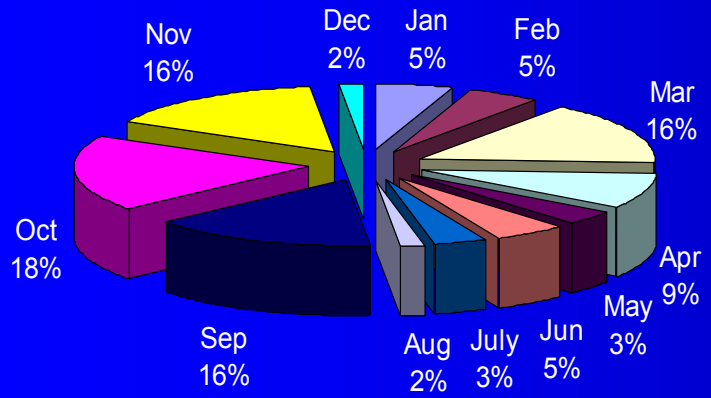
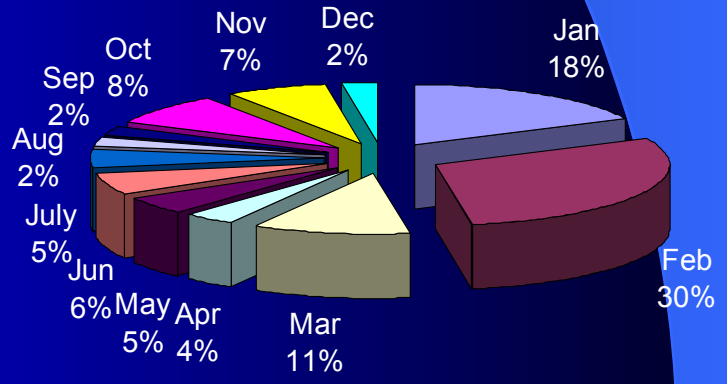


2002



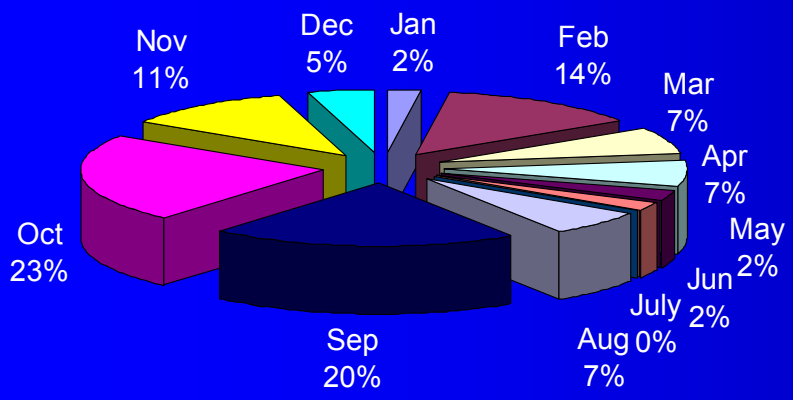
Raw NMAC Frequencies

2003

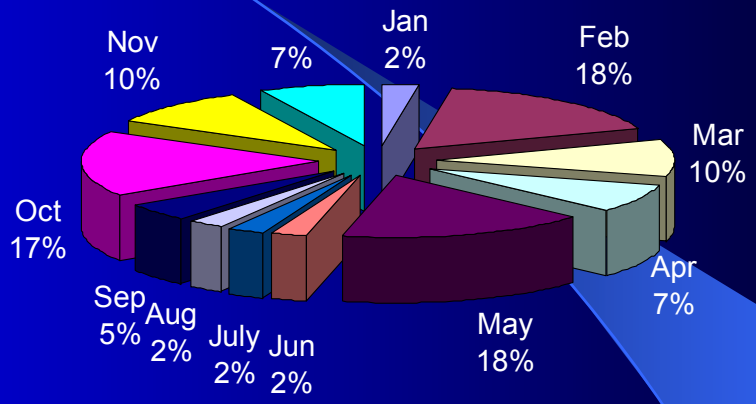


Prescott

1996



1997



Raw NMAC Frequencies

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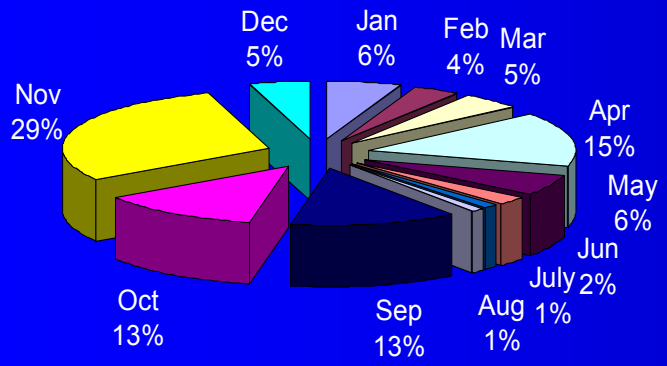
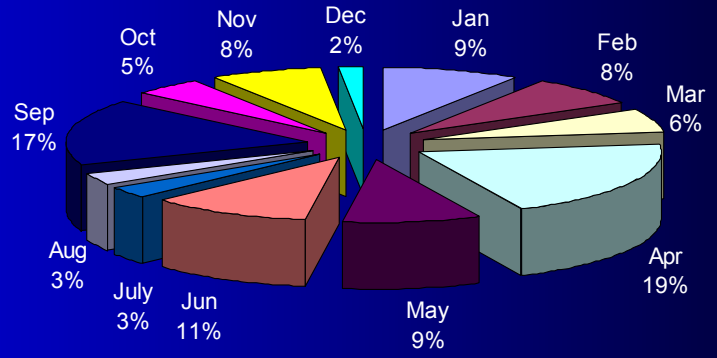
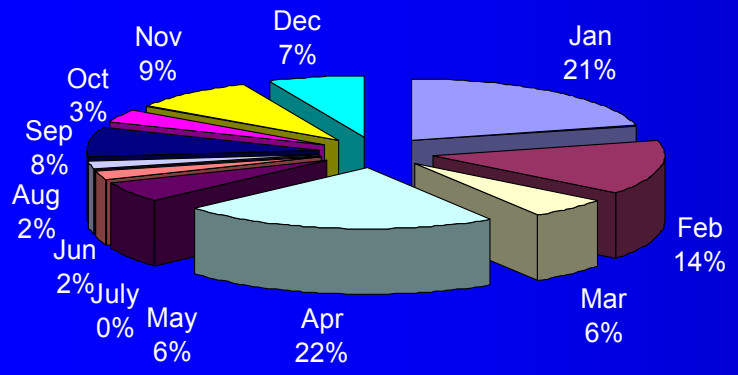


1999



Prescott

2000



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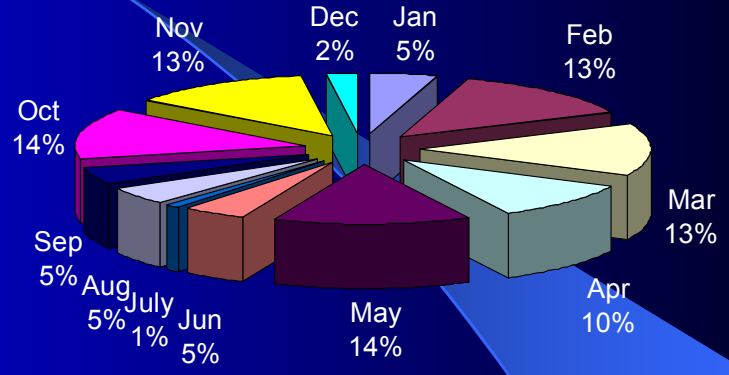
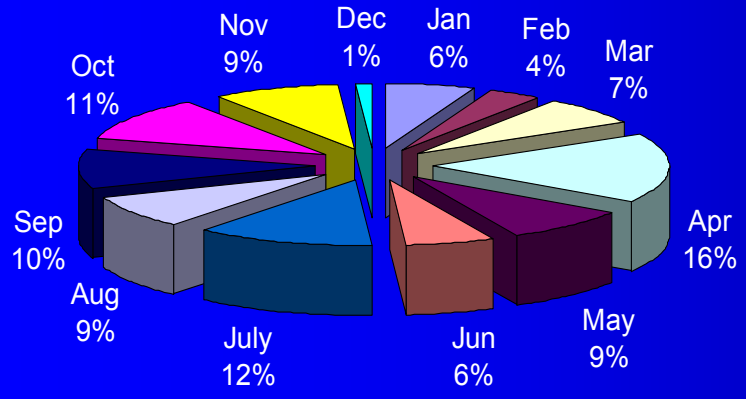
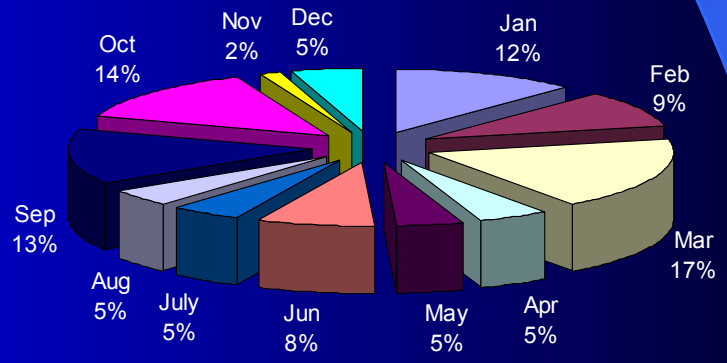


Raw NMAC Frequencies

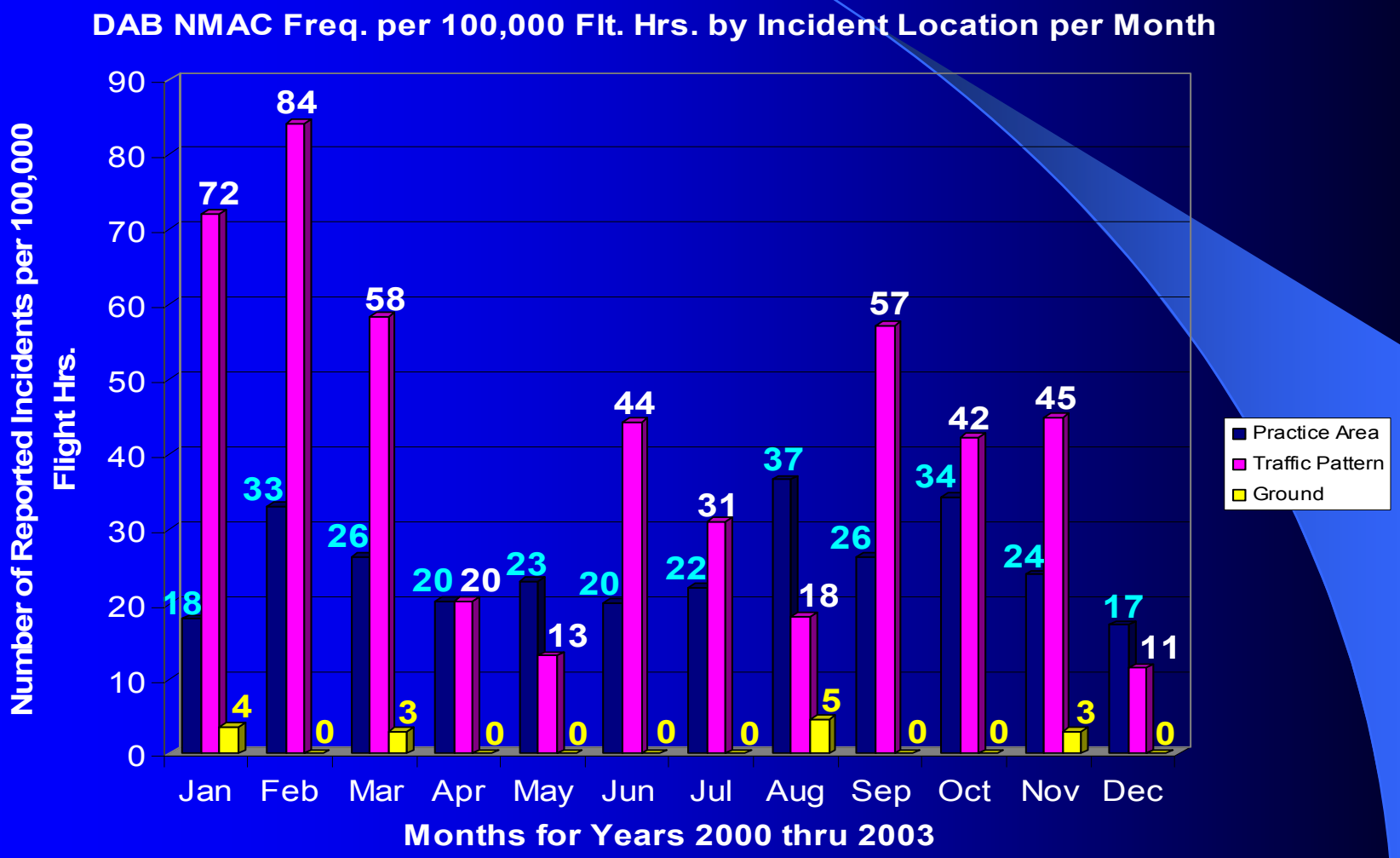
2002



2003



Daytona Beach



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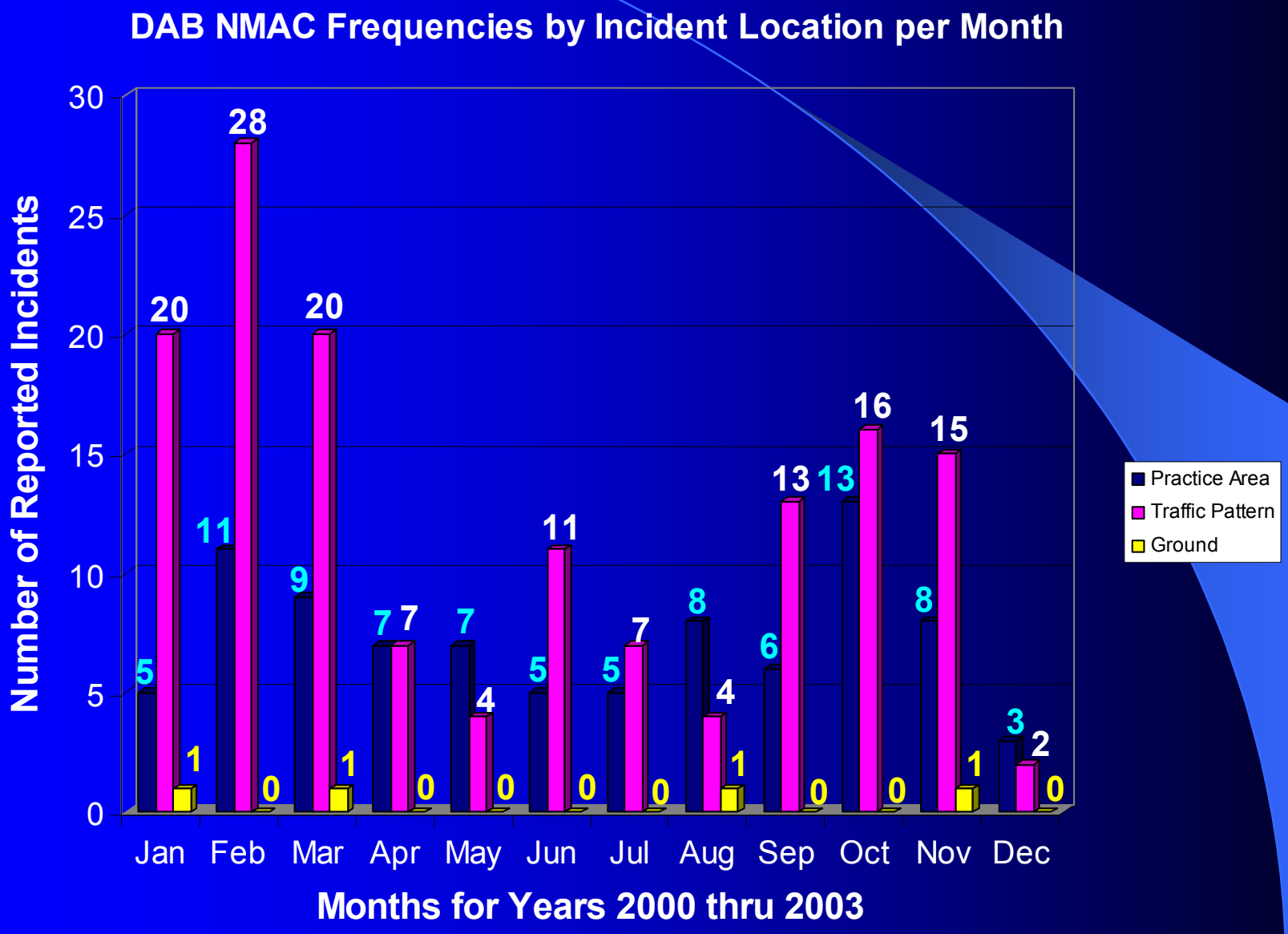

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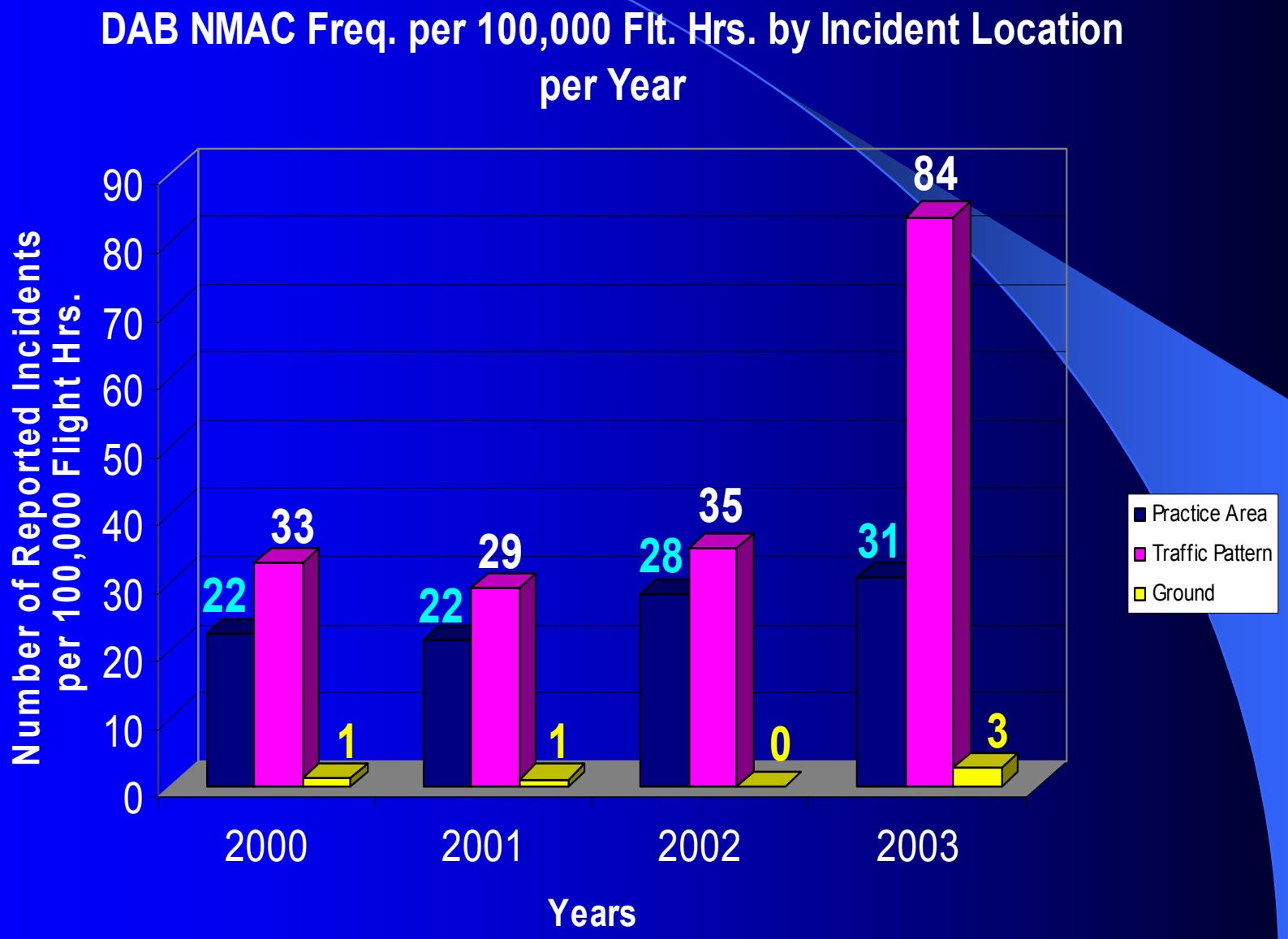

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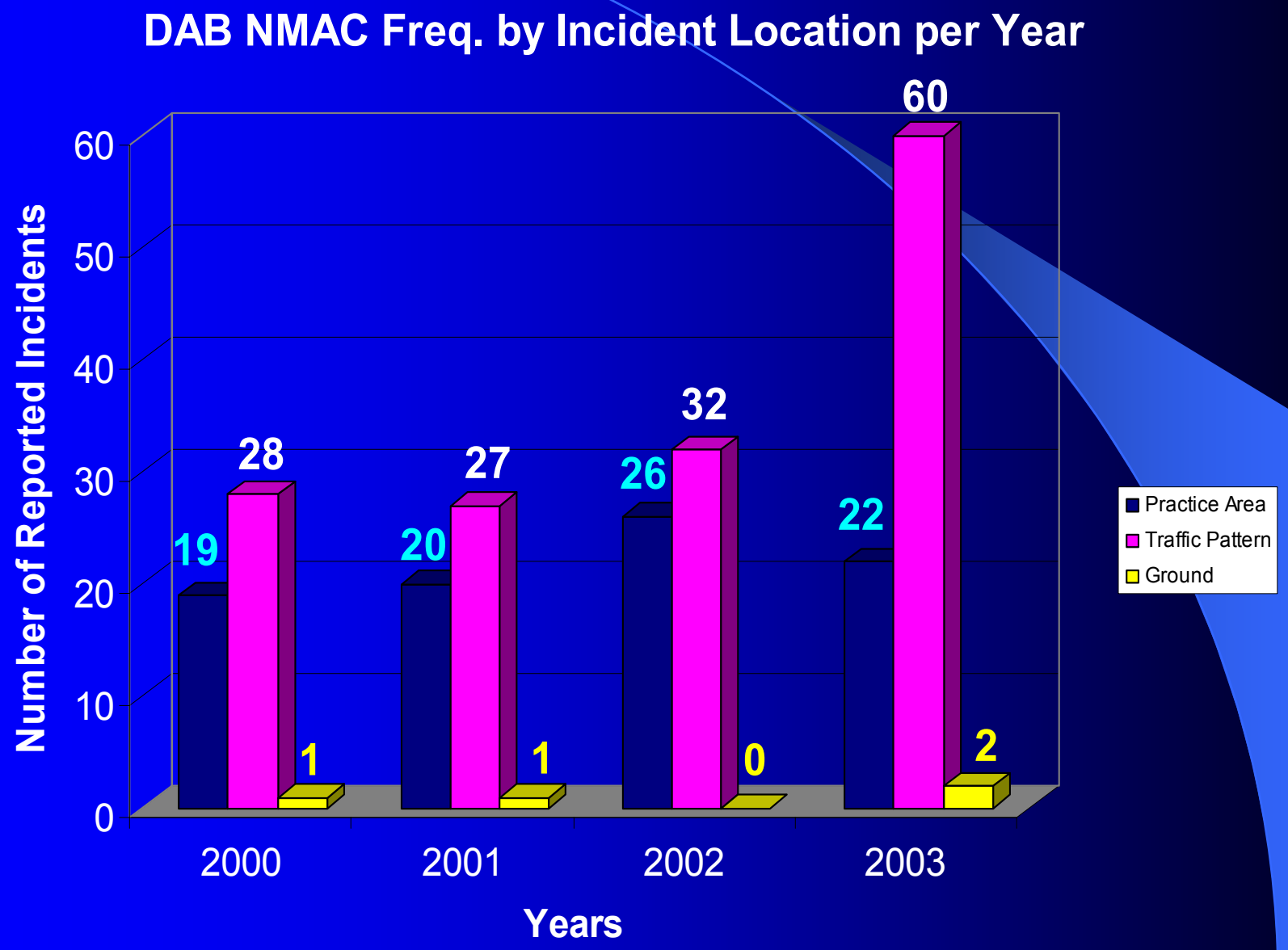

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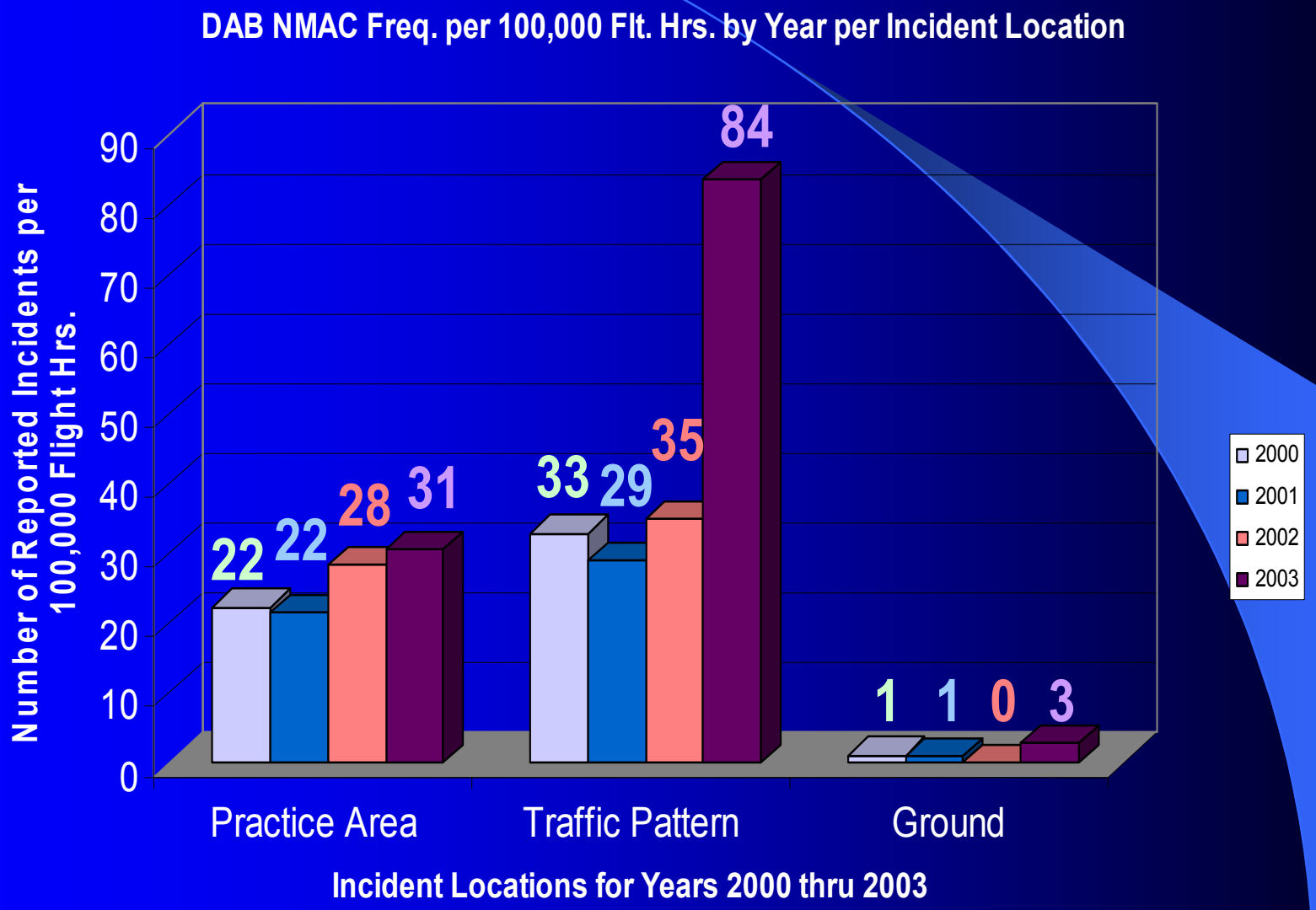

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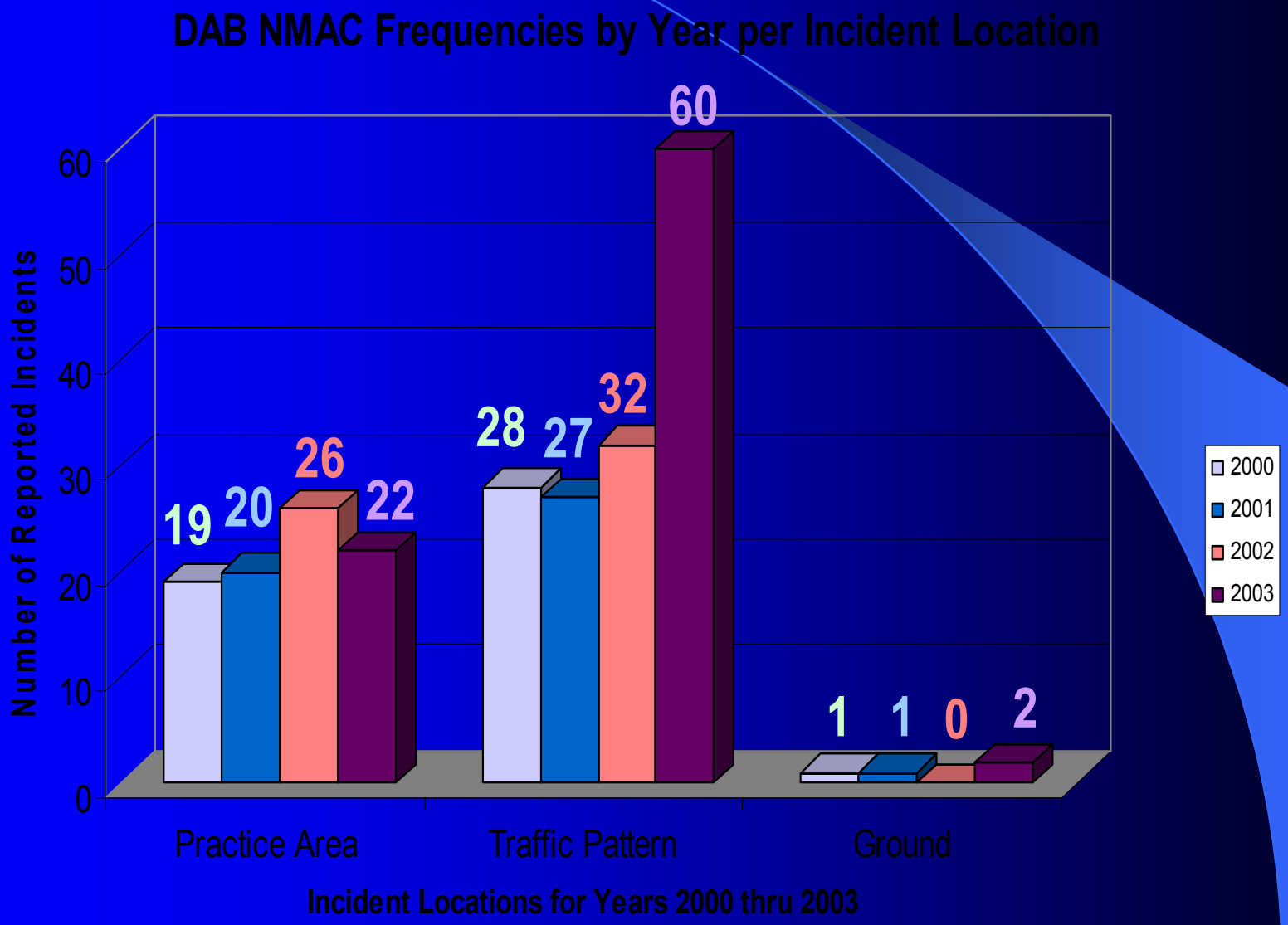

Next Steps

- Continue to acquire and harvest currently unavailable data.
- ADSB final install due Jun 04
  - GBT turned on April 7, 04
- Monitor and gather data 24 months
- Calculate rate per 100k hours
- Assess

Summary

- Hypothesis
- Data Collected
- Future Collection
- Implications for all general aviation