Traffic Management Model for Determining Sector Capacity

Simplified methodology

Doc 9971
Appendix D

Definition

Optimum Sector capacity:

The number of flights

- in a given sector
- for a specified period of time

that can be managed safely and efficiently

Definition

Sector capacity:

Optimum sector capacity adjusted for local considerations

Factors that affect sector capacity:

Airway structure in the sector

Airspace volume of the sector

- Vertically and horizontally

Complexity of operations in the sector

- Number of adjoining sectors
- Amount of climbing/descending traffic
- Terrain
- Military operations and special use airspace

Determining optimum sector capacity – Step 1

For each 15-minute time period:

- Measure and determine the average time a flight spends in a sector
- In most cases, this will be measured
  - from 7am to 7pm
  - Monday through Friday

Example: Average flight time in a sector

- You observe 20 flights in the sector in 15 minutes
- Add their individual sector times together

Example: Average flight time in a sector

Flight number	Time in sector	Flight number	Time in sector
Flight 1	5 minutes	Flight 11	6 minutes
Flight 2	7 minutes	Flight 12	5 minutes
Flight 3	5 minutes	Flight 13	6 minutes
Flight 4	6 minutes	Flight 14	6 minutes
Flight 5	7 minutes	Flight 15	5 minutes
Flight 6	8 minutes	Flight 16	5 minutes
Flight 7	6 minutes	Flight 17	6 minutes
Flight 8	7 minutes	Flight 18	7 minutes
Flight 9	8 minutes	Flight 19	5 minutes
Flight 10	5 minutes	Flight 20	5 minutes

120 minutes, in this example

Example: Average flight time in a sector

- Divide 120 minutes by 20 (flights)
  - To obtain the average
- The quotient is the average sector flight time, in minutes

120 / 20 = 6 minutes average sector flight time

Determining optimum sector capacity – Step 2

Multiply the average sector flight time in minutes by 60 seconds

To determine the average sector flight time, in seconds

Determining optimum sector capacity – Step 2

In this example:

- The average sector flight time is 6 minutes
- Multiply 6 minutes by 60 seconds

6 minutes X 60 seconds = 360 seconds

This is the average sector flight time, in seconds

Determining optimum sector capacity – Step 3

Divide the average sector flight time in seconds by 36 seconds

- Why 36 seconds?
- It is the value established by human factor experts at the U.S. Department of Transportation
- It represents the average time a controller interacts with a flight while in a sector

Determining optimum sector capacity

In this example:

- The average sector flight time is 360 seconds
- Divide 360 seconds by 36 seconds

360 seconds / 36 seconds = 10

- 10 is the optimum sector capacity value for each 15 minute time period

Determining Optimum Sector Capacity – table method

Average sector flight time (in minutes)	*Optimum sector capacity value (aircraft count)*
3	5
4	7
5	8
6	10
7	12
8	13
9	15
10	17
11	18
12 or more	18

Determining sector capacity – Step 4

Adjust the optimum sector capacity value

- Apply local, professional judgment and adjust the optimum sector capacity value, as necessary

- May be adjusted up or down

Determining sector capacity – Step 4

Adjust the optimum sector capacity value

- Take into consideration the factors that affect the sector
  - Airway structure in the sector
  - Airspace volume of the sector
    - Vertically and horizontally
  - Complexity of operations in the sector
    - Number of adjoining sectors
    - Amount of climbing/descending traffic
    - Terrain
    - Military operations and special use airspace

Determining sector capacity -- Step 4

Optimum sector capacity value

+ / - Adjustment factors

Sector capacity

Custom NAS Monitor (Relative Time Range)

Functions Customize Help

Display Range 2.25 hours (0 1 2 3 4 5 6)

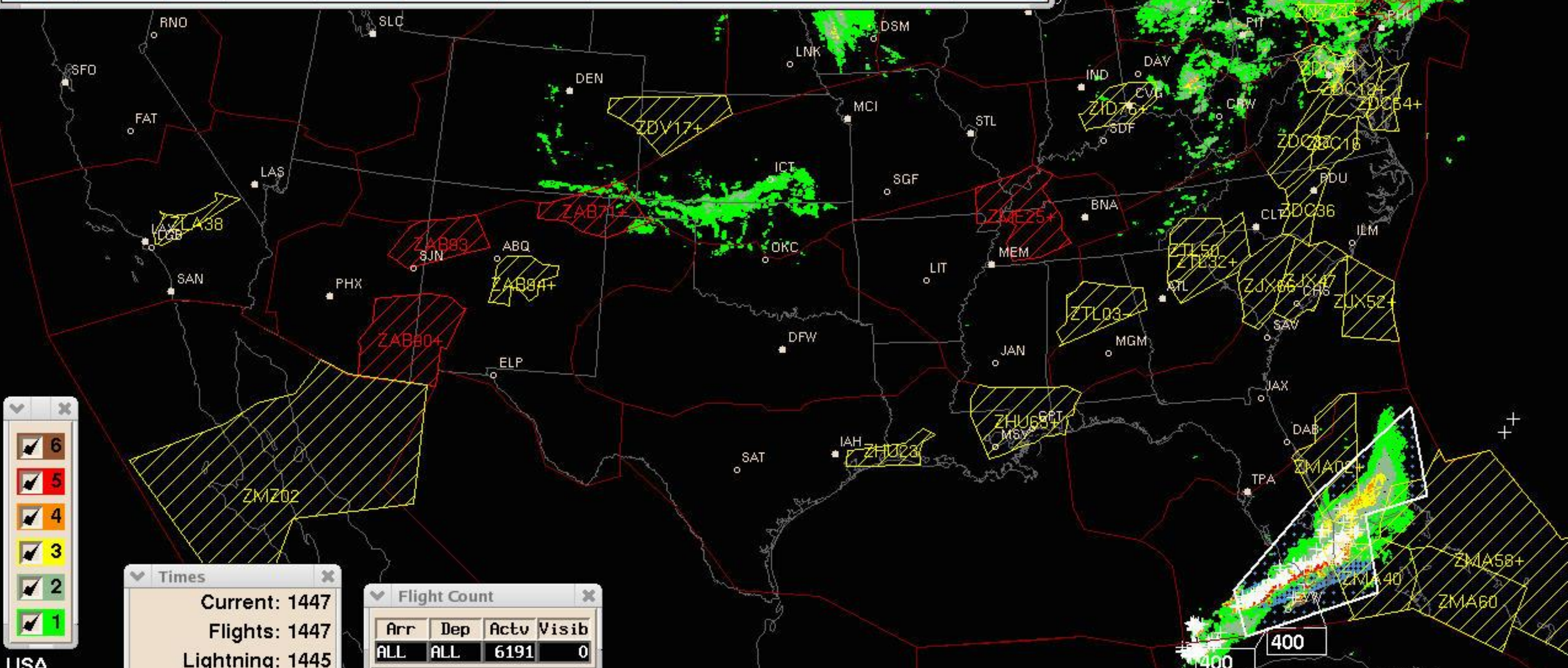
Show only if alerted in next 2.25 hours (Time Limit)

Updated: 1447

Select Elements | Show All Baselines | Sort By: Manual

A	ZDC32	16/16	11	17	18	11	7	9	7	10	13
A	ZAB71+	18/18	12	17	19	18	18	17	13	8	15
A	ZTL03-	17/17	12	11	16	18	10	9	6	10	9
A	ZTL22+	15/15	10	11	12	11	11	9	10	14	14
A	ZAB93	18/18	20	21	21	16	5	7	9	10	12
A	ZID76+	14/14	14	15	11	8	14	9	10	10	11
			1445	1500	1515	1530	1545	1600	1615	1630	1645

Help



6 5 4 3 2 1

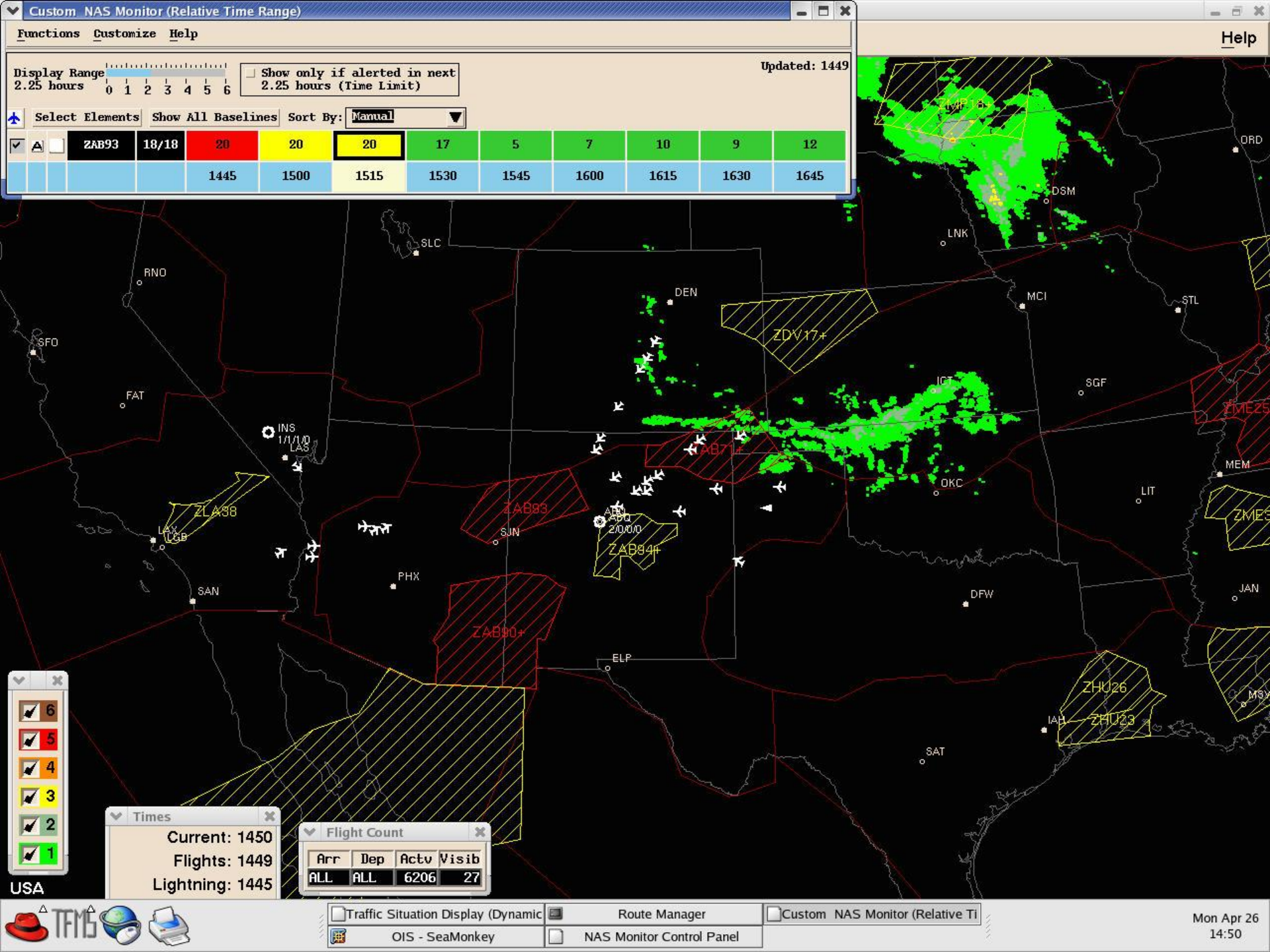
Times
Current: 1447
Flights: 1447
Lightning: 1445

Flight Count

Arr	Dep	Actv	Visib
ALL	ALL	6191	0

TFMS | Traffic Situation Display (Dynamic | Route Manager | Custom NAS Monitor (Relative Ti | OIS - SeaMonkey | NAS Monitor Control Panel

Mon Apr 26
14:47


Custom NAS Monitor (Relative Time Range)
Functions Customize Help
Help
Display Range
2.25 hours
0 1 2 3 4 5 6
Show only if alerted in next
2.25 hours (Time Limit)
Updated: 1449
Select Elements
Show All Baselines
Sort By: Manual
ZAB93 18/18 20 20 20 17 5 7 10 9 12
1445 1500 1515 1530 1545 1600 1615 1630 1645
SLC
RNO
SFO
FAT
LAS
LAX
LGB
SAN
PHX
SJN
DEN
ZDV17+
ZAB71+
ZAB93
ZAB94+
ZAB90+
ZLA38
ICT
OKC
DFW
ELP
SAT
IAH
ZHU26
ZHU23
LNK
DSM
ORD
MCI
STL
SGF
MEM
LIT
JAN
ZME25
ZME
MSY
6
5
4
3
2
1
USA
Times
Current: 1450
Flights: 1449
Lightning: 1445
Flight Count
Arr Dep Actv Visib
ALL ALL 6206 27
Traffic Situation Display (Dynamic
Route Manager
Custom NAS Monitor (Relative Ti
OIS - SeaMonkey
NAS Monitor Control Panel
Mon Apr 26
14:50

Thank you!