

FAA TECHNICAL CENTER LETTER REPORT

DOCUMENTATION OF FORMAT AND CONTENT
OF HUMAN FACTORS DATABASE

by

ROBERT L. BARNETT

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**U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
TECHNICAL CENTER
Atlantic City Airport, N.J. 08405**

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INTRODUCTION.

This documentation describes the database for a flight test program involving 12 subject pilots, flying 72 flights (6 flights each), with a total of 424 midair encounters, using an automatic advisory service. The automatic advisory service was composed of two services; 1. a Traffic Advisory Service (TAS) which displayed a continually updated, course-up traffic map of the airspace around the subject aircraft, and 2. a Resolution Advisory Service (RAS) which suggested conflict avoidance maneuvers calculated on the basis of ground radar surveillance information. A picture of the display is shown on page B3 of Appendix B. A user-oriented description of the display can be found in Reference 1, and a more in-depth description of the automatic advisory service can be found in Reference 2.

Physical data concerning the development of the encounters were taken by on-board observers, and by ground-based magnetic tape recorders. Subjective data concerning pilot opinion and perception were collected with post-flight debriefings and post-encounter debriefings. An extensive analysis of these data was performed by the Federal Aviation Administration Technical Center (Reference 3). This is the largest systematic human factors flight test conducted since the stanine validation studies by the Army Air Corps during World War II. It is, therefore, of interest to the scientific community. This documentation provides a detailed

description of the database so that interested researchers can make use of the data.

FORMAT OF DATABASE.

The database is a sequential file composed of four types of data records:

	No. of records
1. Flight Records	72
2. Encounter Records	424
3. Surveillance Records	364
4. Pilot Records	12

Each type of record is delimited by lines of five repeated numbers (e.g. a flight record begins with a line of five ones (11111) and ends with a line of five twos (22222). This is illustrated in Figure 1, and an example is provided in Appendix A, showing one complete flight and the pilot records.

The database is recorded on magnetic tape in Honeywell 66/60 System Standard format. This consists of a header block at the beginning of the file, and a trailer block at the end of the file, both of fourteen 36-bit words. In between these are the data blocks each of 312 36-bit words. This format is described in detail in Reference 4.

RECORD CONTENT.

This section gives a brief overview of the content of each of the four types of records. Appendix B contains blank

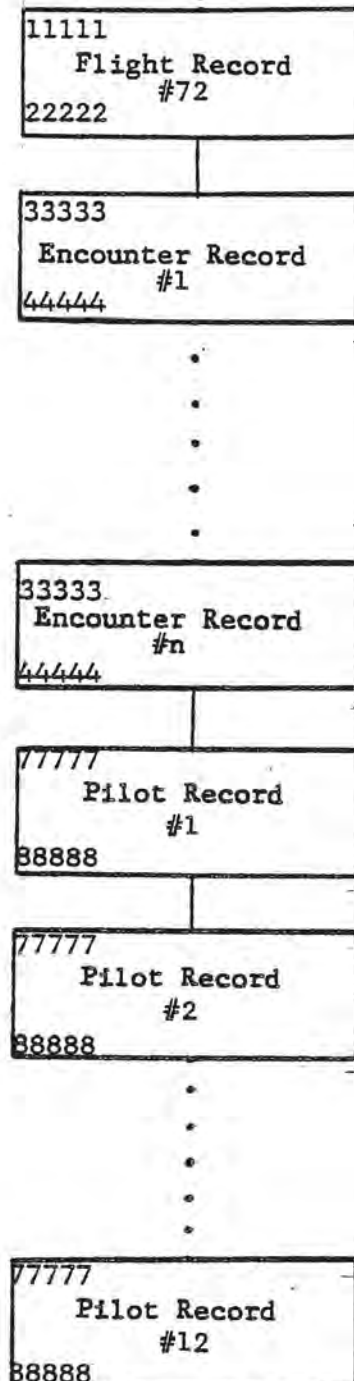
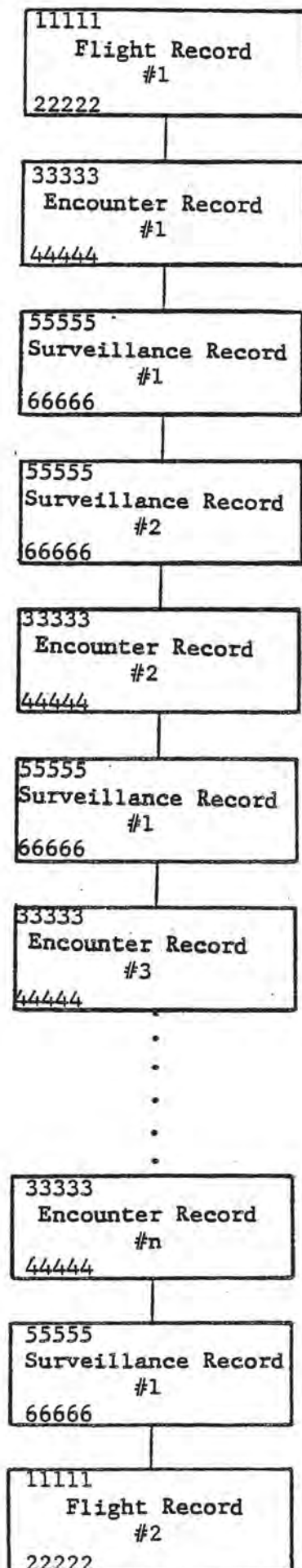


FIGURE 1 - BLOCK DIAGRAM
OF DATABASE FORMAT

copies of the data collection forms for the flight records, encounter records, and pilot records.

FLIGHT RECORDS. The flight records contain the responses to questions from three data collection forms that were completed primarily on the ground:

1. Preflight exam. This was taken by the subject pilot prior to the flight to assess his comprehension of the advisory service.
2. Flight log. Completed by the observer, this form contains data concerning weather conditions, altitudes, identification of personnel, and relevant times.
3. Flight debriefing. This contains 27 questions about the flight and the advisory service that were answered by the subject pilot after the flight was completed.

ENCOUNTER RECORDS. The encounter records contain the responses to questions from two data collection forms that were completed in the air.

1. Encounter log. This was completed by the observer and contains specifics about the development of the encounter, the displayed information, and the subject pilot's reactions.
2. Encounter debriefing. After each encounter the observer asked the subject pilot a series of twelve questions about the encounter and the advisory

service, and recorded the answers on this form.

SURVEILLANCE RECORDS. The surveillance records contain information obtained by the Mode S ground system. This includes, for each radar scan (every 4.7 seconds), the position and velocity of both the subject and intruder aircraft, the time of each scan, and the advisories that were issued to the subject aircraft. When the encounter involves more than one intruder aircraft, there are more than one surveillance record, one for each intruder.

PILOT RECORDS. The pilot records contain the responses to the questions from two data collection forms that were completed on the ground before any flights were made.

1. Subject pilot background information. This form contains personal data such as age, type of work, and details of flight experience.
2. Ground school exam. These were given to the pilots before and after a half-day classroom training session to assess the knowledge gained from prior self-study with a pilot's manual (Reference 1), and the knowledge gained from the training session. Three versions of the same exam were used.

RECORD FORMAT.

The flight records, encounter records, and pilot records are each of constant length because they contain answers to a specific number of questions. The surveillance records are of variable length because the number of radar scans that an encounter involves is different for each encounter.

An entry of (-1) or (-999999) to a question in either a flight record, encounter record, or pilot record denotes that the answer to that question was either missing or did not readily conform to the requested format for that question. For each of the record types the first line (which is just a series of repeated numbers denoting the start of a record) is considered "line number 1" for that record. Line number 2 of each record (except the pilot records) is called the "header line" and contains information necessary to identify the record uniquely.

Most of the entries in the flight records, encounter records, and pilot records are integer values. Alphabetic characters are used sparingly to aid in locating specific records and in reading through the file. The surveillance records are in a mixed format. In the following format descriptions an underscore (_) denotes a blank space and capital letters (F, E, O, S, and L) are literal characters in the examples.

FLIGHT RECORDS. Each of the flight records is fourteen lines long. The first line of each flight record is a line of five ones (11111) which delimits the beginning of the flight record. The header line (line number 2) contains six fields of five columns each in the following format:

____Fff_____PP_mmddyy_____n_____ttt____bbbb

where

ff = flight number

PP = pilot code number

mmddyy = date (month-day-year)

n = number of encounters in this flight

ttt = average observer's time minus system time for this flight (in seconds)

bbbb = number of lines to follow header in this flight

The eleven lines following the header line (line numbers 3 through 13) contain the coded responses to the questions in forms 1, 2, and 3 (preflight exam, flight log, and flight debriefing respectively). Each of these lines contains ten seven-column right-justified fields. The first entry in each line is the line number for that record and is of the form:

_ff0Lxx

where

ff = flight number

xx = line number

The second entry in each line is the number of the form from which comes the information contained on the line. The

remaining entries are the coded responses from the form. Designation of the location (line number and entry number) of the responses to each question accompanies each question on the forms in Appendix B. An explanation of the coding systems used for the responses, as well as a complete indexing of the flight records, encounter records, and pilot records, is contained in Appendix C.

The last line (line number 14) of the flight record is a line of five twos (22222) which delimits the end of the flight record.

ENCOUNTER RECORDS. Each of the encounter records is eighteen lines long. The first line of each encounter record is a line of five threes (33333) which delimit the beginning of the encounter record. The header line (line number 2) contains five fields of seven columns each in the following format:

____Ee____PP____ff____s____Occc

where

e = encounter number in flight ff
PP = Pilot code number
ff = flight number
s = number of surveillance records following this encounter
ccc = observation number (chronological number of encounters across all flights

The fourteen lines following the header line (line numbers 3

through 16) contain the coded responses to the questions in forms 4 and 5 (encounter log and encounter debriefing, respectively). Each of these lines contains ten seven-column right-justified fields. The first entry in each line is the line number for that record and is of the form:

_ffeLxx

where

ff = flight number

e = encounter number in flight ff

xx = line number

The second entry in each line is the number of the form from which comes the information contained on the line. The remaining entries are the coded responses from the form. Designation of the location (line number and entry number) of the responses to each question accompanies each question on the forms in Appendix B. An explanation of the coding systems used for the responses, as well as a complete indexing of the flight records, encounter records, and pilot records, is contained in Appendix C.

Line 17 contains four seven-column fields. The first entry is the line number (formatted as above) and the following three entries are, respectively, the actual Closest Point of Approach (aCPA) between the two aircraft, the minimum predicted Closest Point of Approach (pCPA), and the vertical component of the aCPA. These values were calculated from the surveillance record(s) which follow the encounter record.

The last line (line number 18) of the flight record is a line of five fours (44444) which delimits the end of the flight record.

SURVEILLANCE RECORDS. The number of lines in each surveillance record is variable because the number of radar scans in each encounter was variable. The first line of each surveillance record is a line of five fives (55555) which delimits the beginning of the surveillance record. The header line (line number 2) contains ten fields of seven columns in the following format:

____Srs____iiii_aaaaaa____cccc____aaa____ff____e____ssss_uuuuu____v____

where

rs = surveillance record number r out of a total

number of s surveillance records for this encounter

iiii = ATCRBS identification number of intruder

aaaaaa = actual Closest Point of Approach (aCPA)

cccc = scan number at which aCPA occurs

aaa = number of scans in this surveillance record

ff = flight number

e = encounter number

ssss = slot number of Mode S extraction tape

uuuu = reel number of Mode S extraction tape

v = Mode s site used for this flight (1 = FAATC,

2 = Elwood, and 3 = Clementon) this is important for

interpreting position reports, which are relative to site.

Each line following the header (line numbers 3 to aaa + 2)

corresponds to one scan of the Mode S sensor. Table 1 gives the assignment of each column in these lines, the units (in parentheses), and the FORTRAN field specification (in square brackets []).

TABLE 1 - DESIGNATION OF SURVEILLANCE RECORD FORMAT

COLUMNS	MEANING
1 - 5	Scan number [I5]
7 - 17	Time (HH:MM:SS.SS) [I2,':',I2,':',F5.2]
19 - 25	X-Position of subject aircraft relative to sensor in nautical miles (nm.) [F7.3]
26 - 33	Y-Position of subject aircraft relative to sensor (nm.) [F7.3]
35 - 41	Altitude of subject aircraft (feet) [F7.0]
43 - 49	Velocity of subject aircraft in X-direction (nm./s) [F7.3]
51 - 57	Velocity of subject aircraft in Y-direction (nm./s) [F7.3]
59 - 65	Velocity of subject aircraft in Z-direction (ft./min) [F7.3]
67	Advisory state: 1=Proximate, 2=Threat, 4=Resolution Advisory, Combinations are summed [I1]
69 - 75	Three-dimensional separation (feet) [F7.0]
77 - 79	Coded resolution advisories (see Appendix C for coding) [I3]
81	Vertical speed limit (see Appendix C for coding) [I1]
82 - 89	X-Position of intruder aircraft relative to sensor in nautical miles (nm.) [F7.3]
91 - 97	Y-Position of intruder aircraft relative to sensor (nm.) [F7.3]
99 - 105	Altitude of intruder aircraft (feet) [F7.0]
107 - 113	Velocity of intruder aircraft in X-direction (nm./s) [F7.3]
115 - 121	Velocity of intruder aircraft in Y-direction (nm./s) [F7.3]
123 - 129	Velocity of intruder aircraft in Z-direction (ft./min) [F7.3]

The last line of the surveillance record (line number $gag + 3$) is a line of five sixes (66666) which delimits the end of each surveillance record.

PILOT RECORDS. Each of the pilot records is six lines long. The first line of each pilot record is a line of five sevens (77777) which delimits the beginning of the pilot record, and the last line is a line of five eights (88888) which delimits the end of the pilot record. The four lines in between each contain a seven-column field for line number and 25 three-column right-justified fields of data. The line number is the first entry in each line and is of the form:

___PPLx

where

PP = Pilot identification number

x = line number

The remaining 25 entries on each line are the coded responses from the subject pilot background information form and the ground school exam form (forms 6 and 7, respectively). Lines 2 and 3 of the pilot record are dedicated to form 6, and lines 4 and 5 are dedicated to form 7; line 4 to the first administration of the ground school exam and line 5 to the second. Since three different versions of the exam were used, (forms 7A, 7B, and 7C), entry number 23 on lines 4 and 5 identify which version the pilot took. Entry number 25 on lines 4 and 5 shows the total number of answers (out of 20) that were correct. Designation of the location (line number and entry number) of the responses to each question accompanies each question on the forms in Appendix B. An explanation of the coding systems used for the responses, as well as a complete indexing of the flight records, encounter records, and pilot records, is contained in Appendix C.

REFERENCES

1. Psychophysics Laboratory, Pilot's Manual, Columbia University, New York, 1980.
2. Lucier, E., Ualink Information Provided by AIARS, FAA Systems Research and Development Service, SRDS Technical Letter Report RD-80-11-LR, April 1980.
3. Thedford, William A., et al., Pilot Utilization of Automatic Traffic and Resolution Advisories, FAA Technical Center Letter Report CT-82-100-89LR, July 1982.
4. Honeywell Information Systems, File and Record Control Manual, Honeywell 66/60 manual DD07, April 1974.

APPENDIX A

EXAMPLE FROM DATABASE

This appendix contains two examples from the database: one complete flight from the test series, and the pilot records which begin on page A-11. The blank lines at the beginning and the end of each page are for hard-copy purposes only; there are no blank lines in the database itself.

11111

F12	4	120280	8	9	534				
120L03	1	4	3	120280	2	2	2	2	2
120L04	1	2	1	2	2	0	0	0	0
120L05	22580259	120280	93000	4	3	5152580259	2		
120L06	2	1	2	0	-1	50	15	0	57
120L07	2	42	200	8	3005	-1	74300	0-999999	
120L08	2-999999	94900	45	0	-1	0	0	0	0
120L09	3	4	3	1	0	1	8	9	-1
120L10	3	9	5	5	3	9	7	5	9
120L11	3	505	5	1	3	3	2	3	2
120L12	3	3	7	8	0	0	0	0	0
120L13	3	2	0	0	0	0	0	0	0

22222

33333

E1	4	12	1	0046					
121L03	42580259	1	4	3	1	8	-1	0	
121L04	4	-1	100120	100121	1	999999	1	1	2
121L05	4	0	-1	-1	999999	999999	2	-1	0
121L06	4	8	1	1	8	8	1	1	4
121L07	4	18	1	1	100120	0-999999	999999	999999	
121L08	4	18	0	0	0	0-999999	999999	999999	
121L09	4	18	0	0	0	0-999999	999999	999999	
121L10	4	19	1	0	0	0	0	0	0
121L11	4	19	0	0	0	0	0	0	0
121L12	4	19	0	0	0	0	0	0	0
121L13	4	21	1	0	0	0	0	0	0
121L14	4	21	0	0	0	0	0	0	0
121L15	5	4	1	4	3	4	1	3	1
121L16	5	0	-1	2	1	-1	0	5	2
121L17	7688	7637	-400						

44444

55555

B11	0262	7688	1346	26	12	1	E156	17147	3								
1337 101	0158.19	13.883	-15.847	4300.	-0.035	0.005	-3.086	0	13870.	0	0	12.502	-14.030	4000.	0.051	0.014	2.969
1338 101	11 2.88	13.717	-15.804	4300.	-0.035	0.005	-2.461	0	12767.	0	0	12.724	-13.953	4000.	0.047	0.025	2.656
1339 101	11 7.63	13.563	-15.748	4400.	-0.035	0.006	1.172	0	12046.	0	0	12.724	-13.953	4000.	0.047	0.025	2.656
1340 101	1112.25	13.399	-15.703	4400.	-0.034	0.007	2.695	1	10689.	0	0	13.161	-13.962	3900.	0.052	0.008	0.664
1341 101	1117.00	13.253	-15.641	4400.	-0.034	0.008	3.320	1	10227.	0	0	13.161	-13.962	3900.	0.052	0.008	0.664
1342 101	1121.69	13.114	-15.573	4400.	-0.033	0.009	3.008	1	8671.	0	0	13.487	-14.198	3900.	0.047	-0.017	-1.328
1343 101	1126.38	12.970	-15.523	4300.	-0.033	0.010	-0.625	1	7999.	0	0	13.572	-14.354	3900.	0.020	-0.044	-2.148
1344 101	1131.06	12.802	-15.478	4300.	-0.033	0.011	-2.461	0	7819.	0	0	13.637	-14.501	3900.	-0.002	-0.049	-2.148
1345 101	1135.81	12.647	-15.422	4300.	-0.032	0.011	-3.086	1	8226.	0	0	13.637	-14.501	3900.	-0.002	-0.049	-2.148
1346 101	1140.50	12.492	-15.366	4300.	-0.032	0.011	-3.086	0	7688.	0	0	13.633	-14.823	3900.	-0.004	-0.048	-1.563
1347 101	1145.19	12.333	-15.313	4300.	-0.033	0.012	-2.773	1	7844.	0	0	13.579	-14.782	3900.	-0.032	-0.033	-0.742
1348 101	1149.94	12.174	-15.258	4300.	-0.033	0.012	-2.148	1	8709.	0	0	13.579	-14.982	3900.	-0.032	-0.033	-0.742
1349 101	1154.63	12.028	-15.206	4300.	-0.033	0.012	-1.523	0	8268.	0	0	13.387	-15.221	3900.	-0.030	-0.032	-0.469
1350 101	2159.31	11.864	-15.155	4300.	-0.033	0.012	-0.898	1	8566.	0	0	13.263	-15.316	3900.	-0.031	-0.028	-0.469
1351 101	21 4.00	11.719	-15.088	4300.	-0.033	0.012	-0.586	1	8656.	0	0	13.112	-15.379	3900.	-0.038	-0.013	-0.469
1352 101	21 8.75	11.575	-15.021	4300.	-0.032	0.013	-0.273	1	8630.	0	0	12.936	-15.422	3900.	-0.038	-0.010	-0.469
1353 101	2113.44	11.408	-14.970	4300.	-0.032	0.013	0.037	1	8746.	0	0	12.771	-15.428	3900.	-0.038	-0.008	-0.469
1354 101	2118.13	11.265	-14.901	4200.	-0.032	0.013	-2.695	1	8565.	0	0	12.575	-15.419	3900.	-0.038	-0.005	-0.469
1355 101	2122.88	11.095	-14.852	4200.	-0.033	0.013	-3.906	1	8459.	0	0	12.384	-15.377	4000.	-0.037	0.008	2.578
1356 101	2127.56	10.937	-14.806	4200.	-0.033	0.012	-3.906	1	8383.	0	0	12.219	-15.315	4000.	-0.038	0.010	3.789
1357 101	2132.25	10.780	-14.770	4200.	-0.033	0.011	-3.281	1	8177.	0	0	12.042	-15.236	4000.	-0.038	0.012	3.789
1358 101	2136.94	10.629	-14.717	4200.	-0.033	0.011	-2.383	1	7997.	0	0	11.871	-15.151	4000.	-0.038	0.014	3.164
1359 101	2141.69	10.456	-14.691	4300.	-0.033	0.010	1.602	1	7932.	0	0	11.707	-15.061	4000.	-0.037	0.016	2.539
1360 101	2146.44	10.335	-14.627	4300.	-0.033	0.010	3.438	1	8749.	0	0	11.707	-15.061	4000.	-0.037	0.016	2.539
1361 101	2151.06	10.182	-14.599	4300.	-0.032	0.009	3.750	1	7525.	0	0	11.388	-14.873	3900.	-0.037	0.017	0.547
1362 101	2155.81	10.034	-14.554	4300.	-0.032	0.009	3.438	0	7477.	0	0	11.077	-14.788	3900.	-0.037	0.018	0.547

66666
33333

E2	4	12	1	0047
122L03	42580259	2	4	3 1 8 8 0
122L04	4 2 100302 100304	1	100450	1 7 3
122L05	4 0 1	0	100617-999999	3 1 0
122L06	4 8 1	1	8 8	1 1 3
122L07	4 18 2	1	100302	0-999999-999999-999999
122L08	4 18 2	2	100416	0-999999-999999-999999
122L09	4 18 2	4	100429	1-999999-999999-999999
122L10	4 19 2	2	20 20	0 0 -1
122L11	4 19 0	0	0 0	0 0 0
122L12	4 19 0	0	0 0	0 0 0
122L13	4 21 2	2	-1 8	-1 0 0
122L14	4 21 0	0	0 0	0 0 0
122L15	5 4 2	4	3 7	1 2 1
122L16	5 0 0	2	1 -1	0 5 2
122L17	2521 523	-400		

44444
55555

811	0262	2521	1389	62	12	2	E156	17147	3
1362 101	2155.81	10.034	-14.554	4300.	-0.032	0.009	3.438 0	7433.	0 0 11.233 -14.788 3900. -0.036 0.018 -1.583
1363 101	31 0.50	9.888	-14.507	4300.	-0.032	0.009	2.500 1	7312.	0 0 11.073 -14.704 3900. -0.035 0.019 -2.500
1364 101	31 5.19	9.769	-14.428	4300.	-0.031	0.010	1.602 1	7113.	0 0 10.920 -14.631 3900. -0.035 0.019 -2.813
1365 101	31 9.94	9.624	-14.368	4300.	-0.031	0.011	0.664 1	6997.	0 0 10.757 -14.563 3900. -0.034 0.019 -2.813
1366 101	3114.63	9.480	-14.306	4300.	-0.030	0.012	0.039 1	7036.	0 0 10.623 -14.485 4000. -0.034 0.018 0.586
1367 101	3119.38	9.325	-14.261	4400.	-0.030	0.012	2.773 1	8013.	0 0 10.623 -14.485 4000. -0.034 0.018 0.586
1368 101	3124.06	9.204	-14.195	4400.	-0.030	0.012	3.984 1	8809.	0 0 10.623 -14.485 4000. -0.034 0.018 0.586
1369 101	3128.75	9.062	-14.131	4300.	-0.030	0.013	0.898 1	6876.	0 0 10.181 -14.292 4000. -0.033 0.017 3.047
1370 101	3133.44	8.927	-14.061	4300.	-0.030	0.013	-0.625 1	6875.	0 0 10.045 -14.228 4000. -0.031 0.015 3.047
1371 101	3138.13	8.802	-13.995	4400.	-0.029	0.013	1.523 1	6699.	0 0 9.888 -14.166 3900. -0.031 0.014 -3.281
1372 101	3142.88	8.652	-13.934	4400.	-0.029	0.014	2.461 1	6783.	0 0 9.753 -14.099 3900. -0.030 0.014 -4.102
1373 101	3147.56	8.530	-13.867	4400.	-0.029	0.014	2.773 1	6678.	0 0 9.613 -14.035 3900. -0.030 0.014 -3.789
1374 101	3152.25	8.392	-13.808	4400.	-0.029	0.014	2.773 1	6473.	0 0 9.442 -13.968 3900. -0.031 0.014 -2.852
1375 101	3157.00	8.250	-13.752	4400.	-0.029	0.014	2.461 0	6355.	0 0 9.283 -13.893 3900. -0.031 0.014 -1.953
1376 101	41 1.69	8.114	-13.692	4400.	-0.029	0.014	1.836 1	6185.	0 0 9.119 -13.831 3900. -0.032 0.014 -1.016
1377 101	41 6.38	7.995	-13.621	4400.	-0.029	0.014	1.211 1	5855.	0 0 8.946 -13.762 4000. -0.033 0.014 2.656
1378 101	4111.13	7.855	-13.574	4400.	-0.029	0.014	1.211 1	5681.	0 0 8.779 -13.701 4000. -0.033 0.014 2.656
1379 101	4115.81	7.723	-13.499	4300.	-0.029	0.014	-2.813 2	5450.	0 0 8.609 -13.630 4000. -0.034 0.014 4.492
1380 101	4120.50	7.580	-13.440	4300.	-0.029	0.014	-4.336 2	5194.	0 0 8.424 -13.566 4000. -0.035 0.014 4.180
1381 101	4125.25	7.433	-13.372	4300.	-0.029	0.014	-4.648 2	5035.	0 0 8.251 -13.495 4000. -0.036 0.014 3.281
1382 101	4129.94	7.273	-13.310	4300.	-0.030	0.014	-4.336 6	4806.	64 0 8.054 -13.425 4000. -0.037 0.014 2.070
1383 101	4134.63	7.134	-13.224	4300.	-0.031	0.014	-3.438 6	4597.	64 0 7.878 -13.352 4000. -0.038 0.014 1.133
1384 101	4139.38	6.995	-13.160	4300.	-0.031	0.014	-2.227 6	4231.	64 0 7.679 -13.281 4000. -0.038 0.015 0.234
1385 101	4144.06	6.853	-13.097	4400.	-0.031	0.015	1.758 6	4047.	64 0 7.507 -13.205 4000. -0.039 0.015 -0.391
1386 101	4148.75	6.715	-13.089	4400.	-0.031	0.013	3.594 6	3749.	64 0 7.326 -13.144 4000. -0.039 0.015 -0.703
1387 101	4153.50	6.575	-13.126	4400.	-0.032	-0.000	3.906 6	3411.	1 0 7.132 -13.101 4000. -0.039 0.014 -1.016
1388 101	4158.19	6.480	-13.173	4400.	-0.024	-0.020	3.594 6	2907.	1 0 6.939 -13.055 4000. -0.040 0.013 -1.328
1389 101	51 2.88	6.406	-13.254	4400.	-0.013	-0.028	2.656 6	2521.	1 0 6.743 -13.021 4000. -0.040 0.013 -1.328
1390 101	51 7.63	6.326	-13.349	4400.	-0.018	-0.024	1.719 4	2613.	0 0 6.543 -12.987 3900. -0.041 0.011 -4.063
1391 101	5112.31	6.256	-13.426	4400.	-0.017	-0.024	0.781 0	3064.	0 0 6.350 -12.935 4000. -0.041 0.011 -1.914
1392 101	5117.06	6.156	-13.495	4400.	-0.017	-0.023	0.156 0	3662.	0 0 6.154 -12.896 4000. -0.041 0.010 -0.391
1393 101	5121.75	6.034	-13.515	4500.	-0.017	-0.021	2.930 1	4088.	0 0 5.964 -12.851 4000. -0.041 0.010 0.547
1394 101	5126.44	5.901	-13.508	4500.	-0.024	-0.010	4.141 0	4361.	0 0 5.761 -12.811 3900. -0.042 0.009 -1.914
1395 101	5131.19	5.763	-13.457	4500.	-0.024	0.010	4.141 0	4402.	0 0 5.555 -12.768 4000. -0.042 0.009 0.195
1396 101	5135.88	5.620	-13.408	4400.	-0.020	0.019	0.469 1	4427.	0 0 5.359 -12.731 4000. -0.042 0.009 1.406
1397 101	5140.56	5.481	-13.335	4400.	-0.026	0.016	-1.367 6	4390.	0 0 5.156 -12.695 3900. -0.043 0.008 -1.367
1398 101	5145.25	5.348	-13.269	4400.	-0.027	0.017	-1.992 6	4345.	1 0 4.957 -12.676 3900. -0.043 0.008 -2.578
1399 101	5150.00	5.188	-13.223	4400.	-0.028	0.017	-1.992 6	4242.	1 0 4.766 -12.673 3900. -0.043 0.007 -2.891
1400 101	5154.69	5.041	-13.204	4400.	-0.029	0.016	-1.680 6	4317.	1 0 4.565 -12.683 3900. -0.042 0.005 -2.891

1401	101	6159.38	4.903	-13.191	4400.	-0.030	0.014	-1.055	4	4517.	1	0	4.360	-12.690	3900.	-0.042	0.004	-2.578	
1402	101	61	4.13	4.764	-13.187	4500.	-0.032	0.000	2.266	4	4695.	0	0	4.169	-12.701	4000.	-0.042	0.002	1.094
1403	101	61	8.81	4.622	-13.205	4500.	-0.032	-0.002	3.789	0	4896.	0	0	3.997	-12.703	4000.	-0.042	0.001	2.617
1404	101	6113.50	4.491	-13.219	4500.	-0.032	-0.003	4.102	0	5280.	0	0	3.799	-12.700	4000.	-0.042	0.001	3.242	
1405	101	6118.25	4.363	-13.240	4500.	-0.031	-0.004	3.789	0	5746.	0	0	3.586	-12.710	3900.	-0.042	0.	-0.156	
1406	101	6122.94	4.231	-13.251	4500.	-0.030	-0.004	2.852	1	237175.	0	0	3.398	-12.733	241600.	-0.042	-0.001	-0.156	
1407	101	6127.43	4.092	-13.252	4500.	-0.030	-0.004	1.914	0	237158.	0	0	3.398	-12.733	241600.	-0.042	-0.001	-0.156	
1408	101	6132.38	3.943	-13.234	4500.	-0.030	-0.003	1.016	1	6411.	0	0	3.008	-12.755	3900.	-0.042	-0.001	-1.289	
1409	101	6137.06	3.783	-13.196	4500.	-0.031	-0.001	0.391	0	5451.	0	0	3.008	-12.755	3900.	-0.042	-0.001	-1.289	
1410	101	6141.75	3.652	-13.118	4500.	-0.028	0.012	0.078	0	6411.	0	0	2.637	-12.847	3900.	-0.042	-0.003	-1.289	
1411	101	6146.50	3.505	-13.033	4400.	-0.029	0.014	-3.242	1	5417.	0	0	2.637	-12.847	3900.	-0.042	-0.003	-1.289	
1412	101	6151.19	3.361	-12.934	4400.	-0.029	0.016	-4.453	0	6531.	0	0	2.291	-12.995	3900.	-0.038	-0.014	0.195	
1413	101	6155.88	3.223	-12.844	4400.	-0.029	0.018	-4.453	0	6751.	0	0	2.141	-13.083	3900.	-0.036	-0.018	0.195	
1414	101	71	0.56	3.086	-12.753	4400.	-0.030	0.019	-3.828	0	7213.	0	0	1.989	-13.199	3900.	-0.035	-0.020	0.195
1415	101	71	5.31	2.928	-12.676	4400.	-0.030	0.019	-2.930	1	250116.	0	0	1.863	-13.333	254400.	-0.034	-0.022	0.195
1416	101	7110.00	2.778	-12.596	4400.	-0.031	0.019	-1.992	0	250102.	0	0	1.863	-13.333	254400.	-0.034	-0.022	0.195	
1417	101	7114.75	2.636	-12.522	4400.	-0.031	0.019	-1.094	1	9001.	0	0	1.619	-13.596	3900.	-0.027	-0.029	0.195	
1418	101	7119.44	2.480	-12.441	4400.	-0.031	0.019	-0.156	1	8768.	0	0	1.619	-13.596	3900.	-0.027	-0.029	0.195	
1419	101	7124.13	2.332	-12.366	4400.	-0.031	0.018	0.469	1	10853.	0	0	1.457	-13.920	3800.	-0.018	-0.035	-7.266	
1420	101	7128.88	2.167	-12.293	4400.	-0.032	0.018	0.781	1	11957.	0	0	1.394	-14.100	3800.	0.004	-0.040	-6.406	
1421	101	7133.56	2.015	-12.227	4400.	-0.032	0.017	1.094	0	250346.	0	0	1.329	-14.280	254400.	-0.006	-0.041	-6.406	
1422	101	7138.25	1.870	-12.158	4400.	-0.033	0.016	1.094	0	14328.	0	0	1.243	-14.429	3800.	-0.007	-0.041	-1.953	
1423	101	7143.00	1.708	-12.120	4400.	-0.033	0.015	0.781	0	15339.	0	0	1.143	-14.579	3900.	-0.009	-0.040	8.398	

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1466	101111	5.19	-0.464	-14.946	4500.	-0.021	-0.014	1.328	1	8007.	0 0	0.851	-14.973	4000.	0.041	-0.018	0.156
1467	101111	9.88	-0.585	-15.023	4500.	-0.021	-0.014	-1.758	1	9568.	0 0	1.007	-15.085	4000.	0.040	-0.020	0.156
1468	101111	14.56	-0.666	-15.090	4500.	-0.021	-0.013	-2.969	1	11091.	0 0	1.155	-15.186	4000.	0.039	-0.021	0.156
1469	101111	19.25	-0.768	-15.167	4400.	-0.022	-0.014	-6.289	0	12375.	0 0	1.261	-15.330	4000.	0.037	-0.023	0.156
1470	101111	24.00	-0.860	-15.243	4400.	-0.022	-0.014	-7.227	1	13459.	0 0	1.340	-15.487	3900.	0.023	-0.035	-2.891
1471	101111	28.69	-0.960	-15.339	4400.	-0.021	-0.015	-6.914	1	14108.	0 0	1.341	-15.639	3900.	-0.005	-0.040	-4.102
1472	101111	33.38	-1.037	-15.435	4400.	-0.021	-0.016	-5.703	1	14390.	0 0	1.304	-15.784	3900.	-0.022	-0.033	-4.102
1473	101111	38.06	-1.128	-15.541	4400.	-0.020	-0.017	-4.180	1	250412.	0 0	1.209	-15.894	254400.	-0.033	-0.020	-4.102
1474	101111	42.81	-1.214	-15.636	4400.	-0.020	-0.018	-2.656	1	14110.	0 0	1.085	-15.953	3900.	-0.038	-0.005	-2.969
1475	101111	47.50	-1.313	-15.740	4400.	-0.020	-0.019	-1.445	1	13827.	0 0	0.946	-16.002	3900.	-0.036	-0.013	-1.758
1476	101111	52.19	-1.394	-15.834	4400.	-0.020	-0.020	-0.547	1	13538.	0 0	0.824	-16.029	3900.	-0.035	-0.011	-1.133
1477	101111	56.94	-1.495	-15.927	4400.	-0.020	-0.021	0.078	0	13309.	0 0	0.690	-16.056	3900.	-0.034	-0.010	-0.508
1478	101121	1.63	-1.590	-16.019	4400.	-0.020	-0.021	0.391	1	13098.	0 0	0.562	-16.112	3900.	-0.033	-0.009	-0.195
1479	101121	6.31	-1.668	-16.113	4400.	-0.019	-0.021	0.703	1	12830.	0 0	0.441	-16.176	3900.	-0.031	-0.009	0.117
1480	1011211	11.06	-1.773	-16.214	4400.	-0.019	-0.021	1.016	0	12797.	0 0	0.331	-16.260	3900.	-0.030	-0.009	0.430
1481	10112115	15.75	-1.879	-16.314	4400.	-0.020	-0.021	1.328	0	12952.	0 0	0.251	-16.362	4000.	-0.027	-0.011	3.828
1482	10112120	20.44	-1.907	-16.444	4300.	-0.018	-0.022	-1.719	0	12746.	0 0	0.190	-16.474	4000.	-0.018	-0.021	5.039
1483	10112125	25.13	-1.903	-16.577	4300.	-0.016	-0.023	-2.930	0	12381.	0 0	0.134	-16.596	4000.	0.	-0.028	5.039

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E4	4	12	1	0049
124L03	42580259	4	4	3
124L04	4	4	101339	101354
124L05	4	0	-1	-1
124L06	4	8	1	1
124L07	4	18	4	2
124L08	4	18	0	0
124L09	4	18	0	0
124L10	4	19	4	0
124L11	4	19	0	0
124L12	4	19	0	0
124L13	4	21	4	8
124L14	4	21	0	0
124L15	5	4	4	4
124L16	5	-1	-1	-1
124L17	404	412	-300	

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B11	0262	404	1503	23	12	4	E156	17147	3
1492	101131	7.50	-2.344	-17.562	4400.	-0.021	-0.019	1.914	0
1493	101131	12.19	-2.393	-17.668	4400.	-0.020	-0.020	1.289	0
1494	101131	16.88	-2.469	-17.769	4400.	-0.019	-0.020	0.664	0
1495	101131	21.56	-2.499	-17.888	4300.	-0.017	-0.021	-2.656	0
1496	101131	26.31	-2.498	-18.032	4300.	-0.008	-0.026	-4.180	2
1497	101131	31.00	-2.465	-18.149	4300.	0.012	-0.024	-4.492	2
1498	101131	35.69	-2.359	-18.264	4400.	0.022	-0.017	-1.094	4
1499	101131	40.44	-2.250	-18.359	4400.	0.020	-0.022	1.055	6
1500	101131	45.13	-2.117	-18.447	4400.	0.022	-0.022	2.266	6
1501	101131	49.81	-1.983	-18.533	4400.	0.025	-0.021	2.578	6
1502	101131	54.56	-1.862	-18.616	4400.	0.026	-0.021	2.578	6
1503	101141	59.25	-1.758	-18.729	4300.	0.026	-0.021	-0.820	6
1504	101141	6.39	-1.689	-18.846	4400.	0.025	-0.021	0.391	0
1505	101141	8.63	-1.657	-18.981	4400.	0.023	-0.022	1.016	1
1506	101141	13.31	-1.653	-19.114	4400.	0.010	-0.028	1.328	0
1507	101141	18.06	-1.636	-19.258	4300.	-0.011	-0.028	-1.719	0
1508	101141	22.75	-1.632	-19.390	4300.	-0.004	-0.031	-2.930	0
1509	101141	27.44	-1.606	-19.524	4400.	-0.004	-0.031	-0.156	0
1510	101141	32.13	-1.632	-19.654	4400.	-0.004	-0.031	1.367	0
1511	101141	36.81	-1.620	-19.787	4400.	-0.004	-0.031	1.992	1
1512	101141	41.56	-1.608	-19.920	4400.	-0.003	-0.030	1.992	0

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1513	10114146.25	-1.595	-20.053	4400.	-0.001	-0.030	1.680 0	13188.	0 0	-3.449	-18.925	4200.	-0.027	-0.029	5.039
1514	10114150.94	-1.613	-20.183	4400.	-0.001	-0.029	1.055 0	13525.	0 0	-3.449	-18.925	4200.	-0.027	-0.029	5.039

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125L03	42580259	5	4	3	3	-1	-1	-1	
125L04	4	-1	101529	101606	1	999999	1	1	2
125L05	4	0	-1	-1	101632	999999	2	-1	0
125L06	4	8	8	1	1	8	1	1	4
125L07	4	18	5	1	101529	0-999999-999999-999999			
125L08	4	18	0	0	0	0-999999-999999-999999			
125L09	4	18	0	0	0	0-999999-999999-999999			
125L10	4	19	5	0	0	0	0	0	0
125L11	4	19	0	0	0	0	0	0	0
125L12	4	19	0	0	0	0	0	0	0
125L13	4	21	5	0	0	0	0	0	0
125L14	4	21	0	0	0	0	0	0	0
125L15	5	4	5	4	3	7	1	1	1
125L16	5	0	0	2	3	-1	2	3	1
125L17	10275	10148	300						

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126L03	4	12	2	0051					
126L04	4	2580259	4	4	3	8	7	0	
126L05	4	0	0	0 102050 102055	1	102240	2	7	3
126L06	4	8	1	1	8	8	1	1	3
126L07	4	18	6	1 102050	0-9999999-9999999-9999999				
126L08	4	18	6	2 102111	0-9999999-9999999-9999999				
126L09	4	18	6	4 102135	1-9999999-9999999-9999999				
126L10	4	19	6	1	25	10	0	0	-1
126L11	4	19	0	0	0	0	0	0	0
126L12	4	19	0	0	0	0	0	0	0
126L13	4	21	6	1	-1	7	-1	0	0
126L14	4	21	0	0	0	0	0	0	0
126L15	5	4	6	4	3	2	0	2	1
126L16	5	0	2	2	3	-1	2	1	2
126L17	1989	375	300						

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	812	0262	1989	1611	53	12	6	E156	17147	3								
1571	10119118.88	0.444	-27.560	4400.	0.033	-0.023	-0.625	0	13592.	0 0	0.895	-25.370	4800.	0.008	-0.035	0.898		
1572	10119123.56	0.573	-27.679	4400.	0.031	-0.023	-1.250	0	13155.	0 0	0.961	-25.550	4800.	0.011	-0.036	-0.039		
1573	10119128.25	0.715	-27.807	4400.	0.031	-0.024	-1.250	0	12792.	0 0	1.046	-25.729	4800.	0.013	-0.037	-0.352		
1574	10119132.94	0.846	-27.925	4400.	0.030	-0.024	-0.938	0	12400.	0 0	1.143	-25.907	4800.	0.014	-0.037	-0.664		
1575	10119137.69	0.958	-28.053	4400.	0.029	-0.025	-0.625	1	12111.	0 0	1.211	-26.077	4800.	0.015	-0.038	-0.977		
1576	10119142.38	1.081	-28.170	4400.	0.028	-0.025	-0.313	1	11651.	0 0	1.290	-26.265	4800.	0.016	-0.038	-1.289		
1577	10119147.06	1.227	-28.296	4400.	0.028	-0.025	-0.313	1	11322.	0 0	1.401	-26.442	4800.	0.016	-0.038	-1.289		
1578	10119151.75	1.363	-28.421	4400.	0.028	-0.026	0.313	1	10891.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1579	10119156.50	1.457	-28.548	4400.	0.027	-0.026	0.625	1	11649.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1580	101201.1.19	1.607	-28.672	4400.	0.027	-0.026	0.938	1	12437.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1581	101201.5.88	1.747	-28.795	4400.	0.027	-0.027	1.250	1	13270.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1582	10120110.56	1.877	-28.919	4400.	0.027	-0.027	1.250	1	14140.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1583	10120115.31	2.020	-29.051	4400.	0.027	-0.027	1.250	1	15103.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1584	10120120.00	2.119	-29.186	4400.	0.027	-0.027	1.250	1	16044.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1585	10120124.69	2.219	-29.321	4400.	0.027	-0.027	1.250	1	16995.	0 0	1.452	-26.632	4800.	0.017	-0.038	-0.977		
1586	10120129.38	2.344	-29.463	4400.	0.026	-0.028	0.	1	8380.	0 0	2.191	-28.094	4800.	0.017	-0.038	-0.977		
1587	10120134.13	2.457	-29.596	4400.	0.025	-0.028	-0.313	1	8010.	0 0	2.318	-28.287	4800.	0.017	-0.038	-0.977		
1588	10120138.81	2.560	-29.730	4400.	0.025	-0.028	-0.625	1	7707.	0 0	2.430	-28.470	4800.	0.017	-0.038	-0.977		
1589	10120143.50	2.733	-29.857	4400.	0.026	-0.029	-0.938	0	7415.	0 0	2.545	-28.653	4800.	0.017	-0.038	-0.977		
1590	10120148.19	2.781	-30.005	4400.	0.025	-0.029	-1.250	2	7218.	0 0	2.661	-28.825	4800.	0.025	-0.038	0.039		
1591	10120152.94	2.967	-30.129	4400.	0.025	-0.029	-1.250	2	6937.	0 0	2.756	-29.009	4800.	0.024	-0.038	0.039		
1592	10120157.63	3.040	-30.274	4400.	0.025	-0.030	-0.938	2	6665.	0 0	2.886	-29.190	4800.	0.024	-0.038	0.039		
1593	101211.2.31	3.161	-30.415	4400.	0.025	-0.030	-0.625	2	6495.	0 0	2.983	-29.383	4800.	0.024	-0.038	0.039		
1594	101211.7.00	3.245	-30.548	4400.	0.024	-0.030	-0.313	2	6116.	0 0	3.094	-29.555	4800.	0.024	-0.038	0.039		
1595	10121111.69	3.357	-30.699	4400.	0.024	-0.030	0.	2	5929.	0 0	3.228	-29.734	4800.	0.024	-0.038	0.039		
1596	10121116.44	3.397	-30.847	4400.	0.022	-0.030	0.313	2	5679.	0 0	3.318	-29.918	4800.	0.024	-0.038	0.039		
1597	10121121.13	3.556	-30.982	4400.	0.022	-0.030	0.625	2	5437.	0 0	3.420	-30.100	4800.	0.024	-0.039	0.039		
1598	10121125.81	3.587	-31.141	4400.	0.022	-0.030	0.625	2	6419.	0 0	3.420	-30.100	4800.	0.024	-0.039	0.039		
1599	10121130.50	3.688	-31.282	4400.	0.020	-0.031	1.250	2	4945.	0 0	3.628	-30.473	4800.	0.023	-0.039	0.039		
1600	10121135.19	3.754	-31.427	4400.	0.019	-0.031	1.250	6	4590.	2 0	3.724	-30.675	4800.	0.023	-0.040	0.039		
1601	10121139.94	3.881	-31.565	4400.	0.019	-0.031	0.938	6	4338.	2 0	3.830	-30.856	4800.	0.023	-0.040	0.039		
1602	10121144.63	3.949	-31.719	4400.	0.019	-0.031	0.625	6	4096.	2 0	3.914	-31.049	4800.	0.022	-0.040	0.039		
1603	10121149.31	4.041	-31.861	4400.	0.019	-0.031	0.313	6	3787.	128 0	4.023	-31.240	4700.	0.021	-0.040	-3.047		
1604	10121154.06	4.172	-32.007	4400.	0.020	-0.031	0.	6	3538.	128 0	4.073	-31.437	4800.	0.020	-0.041	-1.211		
1605	10121158.75	4.218	-32.164	4400.	0.019	-0.031	-0.313	6	3378.	128 0	4.219	-31.612	4800.	0.021	-0.041	0.		
1606	101221.3.44	4.287	-32.308	4400.	0.018	-0.031	-0.625	6	3031.	128 0	4.308	-31.814	4800.	0.021	-0.041	0.625		
1607	101221.8.13	4.420	-32.454	4400.	0.019	-0.031	-0.938	6	3928.	128 0	4.308	-31.814	4800.	0.021	-0.041	0.625		
1608	10122112.88	4.528	-32.592	4400.	0.020	-0.031	-1.250	6	2568.	128 0	4.508	-32.175	4800.	0.021	-0.041	0.898		
1609	10122117.56	4.613	-32.744	4400.	0.020	-0.031	-1.250	6	2343.	128 0	4.611	-32.364	4800.	0.021	-0.040	0.898		
1610	10122122.25	4.661	-32.900	4400.	0.019	-0.031	-0.938	6	2167.	128 0	4.727	-32.553	4700.	0.022	-0.040	-2.188		
1611	10122126.94	4.719	-33.035	4500.	0.018	-0.031	2.383	6	1989.	128 0	4.830	-32.731	4800.	0.022	-0.040	-0.352		
1612	10122131.63	4.647	-33.168	4500.	0.014	-0.031	3.906	6	2788.	128 0	5.008	-32.889	4800.	0.024	-0.039	0.586		
1613	10122136.38	4.588	-33.299	4400.	0.009	-0.030	1.133	4	4097.	0 0	5.195	-33.013	4800.	0.027	-0.037	1.211		
1614	10122141.06	4.607	-33.439	4400.	0.005	-0.030	-0.703	0	5032.	0 0	5.368	-33.119	4800.	0.029	-0.035	1.211		
1615	10122145.75	4.603	-33.603	4400.	0.003	-0.030	-1.641	0	6591.	0 0	5.601	-33.183	4800.	0.042	-0.018	0.898		
1616	10122150.44	4.687	-33.734	4400.	0.002	-0.030	-1.953	0	7831.	0 0	5.871	-33.229	4800.	0.047	0.008	0.586		
1617	10122155.13	4.824	-33.858	4400.	0.005	-0.030	-1.953	0	8834.	0 0	6.135	-33.233	4800.	0.051	-0.002	0.273		
1618	10123159.81	4.933	-33.975	4400.	0.008	-0.029	-1.641	1	9892.	0 0	6.368	-33.209	4800.	0.052	-0.000	-0.039		
1619	101231.4.54	5.148	-34.076	4400.	0.023	-0.021	-1.016	0	10484.	0 0	6.610	-33.162	4800.	0.053	0.002	-0.352		
1620	101231.9.25	5.287	-34.198	4400.	0.027	-0.021	-0.703	1	11573.	0 0	6.832	-33.086	4800.	0.054	0.005	-0.664		
1621	10123113.94	5.349	-34.332	4400.	0.028	-0.022	-0.391	0	13317.	0 0	7.075	-32.983	4800.	0.050	0.020	-0.977		
1622	10123118.63	5.517	-34.459	4400.	0.030	-0.023	-0.078	0	14448.	0 0	7.273	-32.857	4800.	0.049	0.023	-1.289		
1623	10123123.31	5.581	-34.603	4400.	0.029	-0.024	0.234	0	16392.	0 0	7.504	-32.712	4800.	0.049	0.025	-1.289		

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	822	0274	5444	1583	53	12	6	E156	17147	3								
1571	10119118.75	0.444	-27.560	4400.	0.033	-0.023	-0.625	0	27492.	0 0	4.918	-28.214	3400.	-0.049	0.003	11.094		

1572	10119123.44	0.573	-27.679	4400.	0.031	-0.023	-1.250	0	25364.	0 0	4.713	-28.187	3400.	-0.047	0.004	9.570
1573	10119128.19	0.715	-27.807	4400.	0.031	-0.024	-1.250	0	22882.	0 0	4.458	-28.188	3400.	-0.047	0.004	7.461
1574	10119132.88	0.846	-27.925	4400.	0.030	-0.024	-0.938	0	20481.	0 0	4.236	-28.181	3400.	-0.047	0.004	5.313
1575	10119137.56	0.958	-28.053	4400.	0.029	-0.025	-0.625	1	18751.	0 0	4.037	-28.180	3400.	-0.047	0.003	3.477
1576	10119142.31	1.081	-28.170	4400.	0.028	-0.025	-0.313	1	16782.	0 0	3.838	-28.177	3400.	-0.046	0.003	1.953
1577	10119147.00	1.227	-28.296	4400.	0.028	-0.025	-0.313	1	14380.	0 0	3.585	-28.179	3400.	-0.046	0.003	1.953
1578	10119151.75	1.363	-28.421	4400.	0.028	-0.026	-0.313	1	12363.	0 0	3.376	-28.175	3400.	-0.047	0.001	0.117
1579	10119156.44	1.457	-28.548	4400.	0.027	-0.026	0.625	1	10622.	0 0	3.158	-28.180	3400.	-0.047	0.001	-0.195
1580	101201 1.19	1.607	-28.672	4400.	0.027	-0.026	0.938	1	9237.	0 0	3.158	-28.180	3400.	-0.047	0.001	-0.195
1581	101201 5.88	1.747	-28.795	4400.	0.027	-0.027	1.250	1	9406.	0 0	3.158	-28.180	3400.	-0.047	0.001	-0.195
1582	10120110.56	1.877	-28.919	4400.	0.027	-0.027	1.250	1	5752.	0 0	2.460	-28.188	3500.	-0.047	0.000	4.258
1583	10120115.25	2.020	-29.051	4400.	0.028	-0.027	0.938	1	5444.	0 0	2.243	-28.196	3500.	-0.048	-0.001	4.258
1584	10120120.00	2.119	-29.186	4400.	0.027	-0.027	0.625	1	6129.	0 0	2.243	-28.196	3500.	-0.048	-0.001	4.258
1585	10120124.69	2.219	-29.321	4400.	0.026	-0.028	0.313	1	210128.	0 0	1.797	-28.192	214400.	-0.048	-0.001	4.258
1586	10120129.38	2.344	-29.463	4400.	0.026	-0.028	0.	1	9028.	0 0	1.591	-28.189	3600.	-0.047	-0.001	8.477
1587	10120134.13	2.457	-29.596	4400.	0.025	-0.028	-0.313	1	10822.	0 0	1.384	-28.179	3700.	-0.046	-0.000	17.422
1588	10120138.81	2.560	-29.730	4400.	0.025	-0.028	-0.625	1	12682.	0 0	1.168	-28.179	3700.	-0.046	0.000	11.328
1589	10120143.50	2.733	-29.857	4400.	0.026	-0.029	-0.938	0	14849.	0 0	0.962	-28.177	3700.	-0.045	0.000	7.344
1590	10120148.19	2.781	-30.005	4400.	0.025	-0.029	-1.250	2	16834.	0 0	0.713	-28.164	3800.	-0.046	0.001	8.984
1591	10120152.94	2.967	-30.129	4400.	0.025	-0.029	-1.250	2	19120.	0 0	0.508	-28.168	3800.	-0.046	0.001	8.359
1592	10120157.63	3.040	-30.274	4400.	0.025	-0.030	-0.938	2	21008.	0 0	0.313	-28.150	3900.	-0.046	0.001	9.883
1593	101211 2.31	3.161	-30.415	4400.	0.025	-0.030	-0.625	2	23186.	0 0	0.097	-28.142	3900.	-0.046	0.002	9.258
1594	101211 7.00	3.245	-30.548	4400.	0.024	-0.030	-0.313	2	25118.	0 0	-0.108	-28.131	4000.	-0.045	0.002	10.781
1595	10121111.69	3.357	-30.699	4400.	0.024	-0.030	0.	2	27223.	0 0	-0.313	-28.130	4000.	-0.045	0.002	10.156
1596	10121116.44	3.397	-30.847	4400.	0.022	-0.030	0.313	2	29005.	0 0	-0.518	-28.116	4100.	-0.044	0.002	11.367
1597	10121121.13	3.556	-30.982	4400.	0.022	-0.030	0.625	2	31417.	0 0	-0.744	-28.111	4100.	-0.044	0.002	10.469
1598	10121125.81	3.587	-31.141	4400.	0.022	-0.030	0.625	2	33089.	0 0	-0.927	-28.095	4200.	-0.044	0.002	10.469
1599	10121130.50	3.688	-31.282	4400.	0.020	-0.031	1.250	2	35160.	0 0	-1.143	-28.097	4200.	-0.044	0.002	10.469
1600	10121135.25	3.754	-31.427	4400.	0.019	-0.031	1.250	6	37103.	2 0	-1.358	-28.087	4300.	-0.044	0.003	11.406
1601	10121139.94	3.881	-31.565	4400.	0.019	-0.031	0.938	6	39253.	2 0	-1.563	-28.087	4300.	-0.044	0.002	10.508
1602	10121144.63	3.949	-31.719	4400.	0.019	-0.031	0.625	6	41221.	2 0	-1.779	-28.084	4300.	-0.045	0.002	8.359
1603	10121149.31	4.041	-31.861	4400.	0.019	-0.031	0.313	6	43225.	128 0	-1.985	-28.080	4400.	-0.045	0.002	8.984
1604	10121154.06	4.172	-32.007	4400.	0.020	-0.031	0.	6	44372.	128 0	-1.985	-28.080	4400.	-0.045	0.002	8.984
1605	10121158.75	4.218	-32.164	4400.	0.019	-0.031	-0.313	6	47295.	128 0	-2.407	-28.078	4400.	-0.045	0.002	7.891
1606	101221 3.44	4.287	-32.308	4400.	0.018	-0.031	-0.625	6	48998.	128 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1607	101221 8.13	4.420	-32.454	4400.	0.019	-0.031	-0.938	6	50152.	128 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1608	10122112.88	4.528	-32.592	4400.	0.020	-0.031	-1.250	6	51154.	128 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1609	10122117.56	4.613	-32.744	4400.	0.020	-0.031	-1.250	6	52088.	128 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1610	10122122.25	4.661	-32.900	4400.	0.019	-0.031	-0.938	6	52852.	128 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1611	10122127.00	4.719	-33.035	4500.	0.019	-0.031	-0.938	6	53602.	128 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1612	10122131.69	4.647	-33.168	4500.	0.019	-0.031	-0.938	6	53701.	128 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1613	10122136.38	4.588	-33.299	4400.	0.019	-0.031	-0.938	4	53873.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1614	10122141.06	4.607	-33.439	4400.	0.019	-0.031	-0.938	0	54470.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1615	10122145.75	4.603	-33.603	4400.	0.019	-0.031	-0.938	0	55052.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1616	10122150.50	4.687	-33.734	4400.	0.019	-0.031	-0.938	0	55943.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1617	10122155.19	4.824	-33.858	4400.	0.019	-0.031	-0.938	0	57063.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1618	10123159.88	4.933	-33.975	4400.	0.019	-0.031	-0.938	1	58022.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1619	101231 4.56	5.148	-34.076	4400.	0.019	-0.031	-0.938	0	59430.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1620	101231 9.25	5.287	-34.198	4400.	0.019	-0.031	-0.938	1	60551.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1621	10123114.00	5.349	-34.332	4400.	0.019	-0.031	-0.938	0	61350.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1622	10123118.69	5.517	-34.459	4400.	0.019	-0.031	-0.938	0	62629.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469
1623	10123123.38	5.581	-34.603	4400.	0.019	-0.031	-0.938	0	63478.	0 0	-2.581	-28.082	4400.	-0.044	0.001	5.469

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E7	4	12	1	0052												
127L03	42580259		7	4	3	4	8	8	0							
127L04	4	4	102853	102910		2	102908	1	6	1						
127L05	4	0	0	0	999999	999999	2	1	0							
127L06	4	8	1	1	8	8	1	1	4							

1712	10130121.69	13.698	-29.927	4300.	0.023	0.041	-3.047	0	12181.	0 0	11.888	-30.855	4800.	0.025	0.034	-1.875
1713	10130126.44	13.807	-29.812	4400.	0.023	0.041	0.	0	12058.	0 0	12.029	-30.691	4800.	0.020	0.041	-0.039
1714	10130131.13	13.938	-29.617	4400.	0.024	0.041	1.523	0	12039.	0 0	12.187	-30.542	4800.	0.033	0.034	0.898
1715	10130135.81	14.034	-29.438	4400.	0.024	0.041	2.148	1	11883.	0 0	12.336	-30.406	4800.	0.035	0.033	1.523
1716	10130140.50	14.172	-29.236	4400.	0.024	0.041	2.148	1	12036.	0 0	12.483	-30.269	4800.	0.036	0.032	1.523
1717	10130145.19	14.276	-29.051	4400.	0.024	0.041	1.836	1	11732.	0 0	12.661	-30.108	4700.	0.037	0.032	-1.875
1718	10130149.88	14.377	-28.865	4400.	0.024	0.040	1.211	1	11674.	0 0	12.806	-29.969	4800.	0.037	0.032	-0.352
1719	10130154.63	14.455	-28.690	4400.	0.023	0.040	0.586	1	11479.	0 0	12.950	-29.830	4800.	0.036	0.031	0.586
1720	10131159.31	14.560	-28.490	4400.	0.023	0.040	0.273	1	11583.	0 0	13.077	-29.686	4800.	0.035	0.031	1.211
1721	101311 4.00	14.690	-28.286	4400.	0.023	0.041	-0.039	1	11847.	0 0	13.207	-29.550	4800.	0.033	0.031	1.211
1722	101311 8.69	14.765	-28.087	4400.	0.022	0.041	-0.352	1	11693.	0 0	13.355	-29.395	4800.	0.032	0.031	0.898
1723	10131113.44	14.853	-27.892	4400.	0.022	0.042	-0.664	1	11741.	0 0	13.479	-29.249	4800.	0.031	0.031	0.586
1724	10131118.13	14.941	-27.696	4400.	0.021	0.042	-0.977	1	11858.	0 0	13.586	-29.099	4800.	0.029	0.031	0.273
1725	10131122.81	15.026	-27.500	4400.	0.020	0.042	-1.289	1	11700.	0 0	13.736	-28.928	4800.	0.028	0.032	-0.039
1726	10131127.50	15.131	-27.292	4400.	0.020	0.042	-1.289	1	11821.	0 0	13.863	-28.766	4800.	0.028	0.033	-0.352
1727	10131132.19	15.197	-27.116	4400.	0.019	0.042	-0.977	1	11498.	0 0	14.006	-28.585	4800.	0.028	0.034	-0.664
1728	10131136.94	15.292	-26.923	4400.	0.019	0.042	-0.664	0	11437.	0 0	14.136	-28.407	4800.	0.028	0.035	-0.977
1729	10131141.63	15.407	-26.717	4400.	0.020	0.042	-0.352	1	11341.	0 0	14.277	-28.201	4800.	0.028	0.036	-1.289
1730	10131146.31	15.504	-26.509	4400.	0.020	0.042	-0.039	1	11355.	0 0	14.398	-28.014	4800.	0.028	0.037	-1.289
1731	10131151.00	15.605	-26.309	4400.	0.020	0.043	0.273	1	11283.	0 0	14.529	-27.821	4800.	0.027	0.039	-0.977
1732	10131155.69	15.603	-26.168	4400.	0.018	0.042	0.586	1	10570.	0 0	14.658	-27.627	4800.	0.027	0.040	-0.664
1733	101321 0.38	15.725	-25.942	4400.	0.018	0.042	0.898	1	10529.	0 0	14.797	-27.404	4800.	0.028	0.041	-0.352
1734	101321 5.13	15.816	-25.756	4400.	0.018	0.041	1.211	1	10157.	0 0	14.948	-27.183	4800.	0.028	0.043	-0.039
1735	101321 9.81	15.929	-25.543	4400.	0.018	0.042	1.211	1	10157.	0 0	15.061	-26.970	4800.	0.028	0.044	0.273
1736	10132114.50	16.021	-25.342	4400.	0.019	0.042	0.898	1	9972.	0 0	15.182	-26.751	4800.	0.028	0.044	0.586
1737	10132119.19	16.154	-25.125	4400.	0.020	0.043	0.586	1	9946.	0 0	15.310	-26.526	4800.	0.028	0.045	0.898
1738	10132123.88	16.209	-24.957	4400.	0.020	0.042	0.273	1	9486.	0 0	15.426	-26.306	4800.	0.027	0.046	1.211
1739	10132128.63	16.329	-24.745	4400.	0.020	0.042	-0.039	1	9553.	0 0	15.536	-26.101	4800.	0.026	0.046	1.211
1740	10132133.31	16.453	-24.542	4400.	0.021	0.043	-0.352	1	9312.	0 0	15.677	-25.862	4800.	0.026	0.046	0.898
1741	10132138.00	16.546	-24.357	4400.	0.022	0.043	-0.664	0	8827.	0 0	15.826	-25.617	4800.	0.027	0.047	0.586
1742	10132142.69	16.638	-24.171	4400.	0.022	0.042	-0.977	1	8596.	0 0	15.953	-25.407	4800.	0.027	0.048	0.273
1743	10132147.38	16.731	-23.971	4400.	0.022	0.042	-1.289	2	8360.	0 0	16.061	-25.171	4800.	0.027	0.048	-0.039
1744	10132152.06	16.838	-23.772	4400.	0.022	0.042	-1.289	2	9732.	0 0	16.061	-25.171	4800.	0.027	0.048	-0.039
1745	10132156.81	16.943	-23.573	4400.	0.022	0.042	-0.977	2	7868.	0 0	16.316	-24.704	4800.	0.027	0.048	-0.195
1746	101331 1.50	17.063	-23.361	4400.	0.022	0.042	-0.664	2	7752.	0 0	16.452	-24.479	4800.	0.027	0.049	-0.508
1747	101331 6.19	17.179	-23.163	4400.	0.023	0.042	-0.352	2	7506.	0 0	16.574	-24.238	4800.	0.027	0.049	-0.820
1748	10133110.88	17.284	-22.971	4400.	0.023	0.042	-0.039	2	7342.	0 0	16.681	-24.016	4800.	0.027	0.049	-1.133
1749	10133115.63	17.389	-22.765	4300.	0.023	0.043	-2.773	2	7112.	0 0	16.819	-23.784	4800.	0.027	0.049	-1.133
1750	10133120.31	17.475	-22.571	4300.	0.023	0.043	-3.984	2	6795.	0 0	16.939	-23.549	4800.	0.027	0.049	-0.820
1751	10133125.00	17.586	-22.356	4300.	0.023	0.043	-3.984	2	6613.	0 0	17.065	-23.308	4800.	0.027	0.050	-0.508
1752	10133129.69	17.649	-22.190	4300.	0.022	0.042	-3.359	2	7680.	0 0	17.065	-23.308	4800.	0.027	0.050	-0.508
1753	10133134.44	17.786	-21.963	4300.	0.022	0.043	-2.461	2	6044.	0 0	17.322	-22.839	4800.	0.027	0.050	-0.234
1754	10133139.13	17.863	-21.783	4300.	0.021	0.042	-1.523	2	5617.	0 0	17.446	-22.604	4800.	0.027	0.050	-0.234
1755	10133143.81	17.942	-21.573	4400.	0.021	0.042	-2.461	6	5265.	2 0	17.570	-22.354	4700.	0.027	0.051	-3.320
1756	10133148.50	18.018	-21.364	4400.	0.020	0.043	-4.297	6	5010.	64 0	17.688	-22.118	4700.	0.027	0.051	-4.258
1757	10133153.19	18.100	-21.162	4400.	0.019	0.043	-4.609	6	4769.	64 0	17.789	-21.881	4700.	0.027	0.051	-4.258
1758	10133157.88	18.195	-20.946	4400.	0.019	0.044	-4.297	6	4521.	64 0	17.904	-21.629	4700.	0.026	0.051	-3.633
1759	101341 2.56	18.280	-20.737	4400.	0.018	0.044	-3.359	6	4370.	64 0	17.985	-21.391	4700.	0.025	0.051	-2.695
1760	101341 7.31	18.333	-20.542	4400.	0.018	0.044	-2.148	6	3954.	64 0	18.100	-21.146	4800.	0.024	0.051	1.289
1761	10134112.00	18.379	-20.310	4400.	0.016	0.045	-1.211	6	3777.	64 0	18.198	-20.901	4800.	0.023	0.051	3.125
1762	10134116.69	18.355	-20.127	4400.	0.013	0.044	-0.273	6	3258.	64 0	18.308	-20.657	4800.	0.023	0.051	3.750
1763	10134121.38	18.338	-19.923	4400.	0.010	0.044	-0.352	6	3034.	64 0	18.415	-20.412	4800.	0.022	0.052	3.438
1764	10134126.06	18.289	-19.734	4400.	-0.010	0.043	-0.664	4	3063.	0 0	18.526	-20.174	4800.	0.022	0.052	2.500
1765	10134130.81	18.196	-19.572	4400.	-0.013	0.042	-0.977	0	3573.	0 0	18.664	-19.922	4800.	0.023	0.052	1.602
1766	10134135.50	18.094	-19.418	4400.	-0.014	0.040	-1.289	0	4347.	0 0	18.746	-19.705	4800.	0.023	0.052	0.664
1767	10134140.19	18.022	-19.236	4400.	-0.018	0.039	-1.289	0	5302.	0 0	18.856	-19.488	4700.	0.023	0.051	-3.008

77777

1L2 1 40 3 2 4 1 1 6 10 24 8 2 0 0 2 1 1 2 1 2 1 1 2 0
 1L3 2 10 5 0 17 36 53 7 7 74 0 14 0 0 0 11 13 1 6 2 25 3 0 0 0
 1L4 4 4 4 1 3 1 0 1 3 4 1 2 4 4 4 2 3 3 4 2 0 1 0 12 0
 1L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 16 0

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2L2 2 84 5 0 4 2 1 4 10 25 5 1 0 0 2 2 2 1 1 1 1 1 2 0
 2L3 1 17 8 0 0 20 37 12 17 11 8 30 40 82 0 18 1 1 7 1 60 0 0 0 0
 2L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 12 0
 2L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 12 0

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4L2 4 47 1 4 4 3 25 1 22 13 6 2 0 0 1 2 2 2 2 1 2 2 2 1 0
 4L3 1 20 10 0 1 20 30 5 3 15 5 30 15 15 0 11 10 1 25 1 35 0 0 0 0
 4L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 9 0
 4L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 14 0

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8L2 8 35 1 2 4 7 2 6 10 11 8 1 0 0 2 1 1 1 2 2 1 1 1 2 0
 8L3 1 8 12 0 17 60 85 14 11 35 0 5 8 10 0 3 3 1 6 4 20 0 0 0 0
 8L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 11 0
 8L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 14 0

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9L2 9 34 1 1 4 1 1 4 14 10 8 2 9 0 2 1 1 1 1 2 1 1 1 2 0
 9L3 2 15 5 2 23 53 87 23 2 80 0 0 4 0 0 13 20 1 4 0 0 3 0 0 0
 9L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 18 0
 9L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 14 0

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10L2 10 60 2 3 3 8 22 3 40 25 10 2 0 0 2 2 2 2 2 1 1 1 1 2 0
 10L3 2 20 70 24 1 18 32 5 35 80 25 20 0 0 0 80 99 1 19 0 0 1 0 4 0
 10L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 15 0
 10L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 12 0

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15L2 15 48 1 2 4 8 25 5 7 18 15 2 0 0 2 1 1 1 2 2 1 1 1 1 0
 15L3 2 3 10 0 15 40 75 16 9 95 7 75 10 65 0 8 21 1 1 0 0 2 0 1 0
 15L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 15 0
 15L5 0

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16L2 16 32 1 4 4 0 2 4 10 8 1 1 0 0 2 2 2 1 1 1 1 1 1 2 0
 16L3 1 10 8 13 27 56 66 40 2 0 0 0 99 99 0 13 9 3 23 2 99 0 0 0 0
 16L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 17 0
 16L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 18 0

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77777

19L2 19 33 1 2 4 5 2 5 11 12 10 2 0 0 2 1 1 1 2 2 1 1 1 2 0
 19L3 2 20 10 0 12 30 40 8 7 60 4 15 25 20 0 7 20 2 3 1 3 2 0 0 0
 19L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 19 0
 19L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 19 0

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20L2 20 33 1 2 4 7 0 5 10 5 25 2 5 5 2 1 1 2 2 2 1 2 1 2 0
 20L3 2 8 15 5 0 0 0 0 2 0 4 0 30 0 0 4 5 1 10 0 0 0 0 0 0
 20L4 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 1 0 18 0
 20L5 4 4 4 2 2 2 4 1 4 4 3 3 4 4 4 4 3 3 3 2 0 2 0 17 0

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21L2	21	30	1	0	4	4	0	4	4	36	26	2	0	0	2	1	1	2	2	2	1	2	1	2	0
21L3	1	10	10	8	0	0	0	1	3	10	3	0	40	0	0	25	15	3	20	3	99	1	1	0	0
21L4	4	4	4	2	2	2	4	1	4	4	3	3	4	4	4	4	3	3	3	2	0	1	0	12	0
21L5	4	4	4	2	2	2	4	1	4	4	3	3	4	4	4	4	3	3	3	2	0	2	0	12	0

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23L2	23	23	5	0	8	0	2	4	4	2	9	2	0	0	1	1	1	1	1	2	1	1	1	2	0
23L3	2	3	8	0	25	60	99	40	1	3	2	15	2	5	0	10	50	3	12	1	40	2	0	0	0
23L4	4	4	4	2	2	2	4	1	4	4	3	3	4	4	4	4	3	3	3	2	0	3	0	16	0
23L5	4	4	4	2	2	2	4	1	4	4	3	3	4	4	4	4	3	3	3	2	0	3	0	17	0

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APPENDIX B

DATA COLLECTION FORMS INDEXED TO DATABASE

This appendix contains the blank forms that the subject pilots and the observers completed throughout the flight test series.

	PAGE
Form 1 - Preflight Exam	B- 2
Form 2 - Flight Log	B- 4
Form 3 - Flight Debriefing	B- 5
Form 4 - Encounter Log	B- 8
Form 5 - Encounter Debriefing	B-10
Form 6 - Subject Pilot Background Information	B-11
Form 7A - Ground School Exam - Version 1	B-16
Form 7B - Ground School Exam - Version 2	B-23
Form 7C - Ground School Exam - Version 3	B-30

Responses to the first three data collection forms are contained in the flight records, responses to data collection forms 4 and 5 are contained in the encounter records, and responses to data collection forms 6 and 7 are contained in the pilot records. Accompanying each question on the data collection forms in this appendix are two numbers of the form a/b, where 'a' is the line number of the response to that question in the database record, and 'b' is the entry number on that line. There are two line numbers for each question on form 7 (Ground School Exam) because each pilot completed the exam twice, once before the ground school training session and once after.

Line 3/Entry 3

MISSION NUMBER: 3/4

DATE: 3/5

1. WHAT DOES THIS NUMBER REPRESENT?

Line 3/Entry 6

2. WHAT COLOR IS THIS SYMBOL?

317

3. WHAT DOES THIS LINE REPRESENT?

3/8

4. WHAT DOES THE LENGTH OF THE ARROW REPRESENT?

3/9

5. WHAT DOES THE CIRCLE REPRESENT?

3/10

6. WHAT COLOR ARE THESE SYMBOLS?

Line 4/Entry 3

7. WHAT DO THESE SYMBOLS REPRESENT?

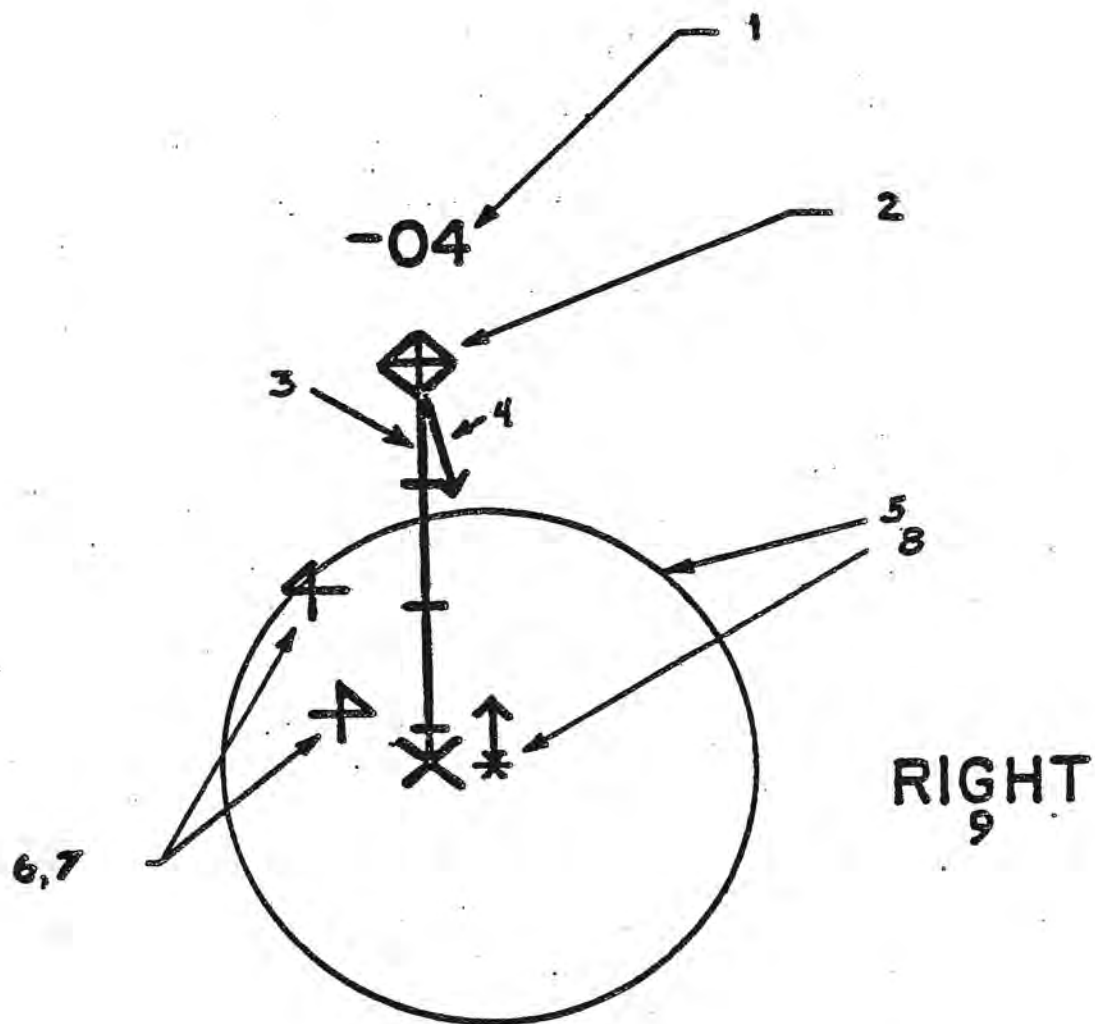
4/4

8. WHAT DOES THIS SYMBOL REPRESENT?

4/5

9. WHAT COLOR IS THIS ADVISORY?

4/6



OBSERVER'S LOG

(Responses contained in Flight Record)

- [1] DATE: Line 5/Entry 4 [2] TIME (LOCAL): 5/5
[3] TEST PILOT ID: 5/6 [4] PILOT MISSION #: 5/7
[5] SAFETY PILOT ID: 5/8
[6] OBSERVER ID: 5/9 [7] FLIGHT ID (A to F): 5/10
[8] TEST AIRCRAFT ID: 6/3 [9] INTRUDER AIRCRAFT ID: Line 6/Entry 4
[10] PRE-FLIGHT CHECK OK (Y/N): 6/5 IF NO, SPECIFY PROBLEM:

[11] WEATHER: SKY(0-9): 6/6 [12] CEILING: 6/7 [13] VISIBILITY: 6/8
[14] OBSTRUCTIONS TO VIS: 6/9 [15] TEMP: 6/10
[16] DEW POINT: 7/3 [17] WIND DIR: Line 7/Entry 4
[18] VELOCITY: 7/5 [19] ALTIMETER: 7/6
[20] PREDICTED WINDS ALOFT (AT 3000 FT): 7/7
[21] DEPARTURE TIME: 7/8
[22] ABORT (Y/N)? (DESCRIBE IN "NOTES" BELOW): 7/9
[23] AUDIO RECORD START (Y/N): 7/10
[24] STOP WATCH START: Line 8/Entry 3
[25] ELAPSED TIME STRAIGHT & LEVEL: 8/4
[26] ALTITUDE STRAIGHT & LEVEL: 8/5
[27] DME FROM ACY AT S & L: 8/6
(28) INTRUDER PILOT ID: 8/7

PRE-FLIGHT NOTES:

DEBRIEFING FORM (Responses contained in Flight Record)

- [1] Test Pilot ID: _____ [2] Pilot Mission #: _____
Line 9/Entry 3 9/4
- [3] What did you think of the colors used to code the ATARS information? _____
9/5
- [4] Would any additional traffic advisory information be useful to you in deciding what or what not to do? _____
9/6
- [5] Was there unnecessary information displayed? _____
9/7

Rate (0-9) each component of the traffic advisory service in terms of how useful it is to you in managing an encounter situation?

- | | | |
|-------------------------------------|-------|-----------------|
| [6] basic traffic symbol + | _____ | 9/8 |
| [7] relative altitude | _____ | 9/9 |
| [8] out-of-range traffic symbol (A) | _____ | 9/10 |
| [9] vertical speed | _____ | Line 10/Entry 3 |
| [10] traffic course track | _____ | 10/4 |
| [11] own aircraft course track | _____ | 10/5 |
| [12] relative motion line | _____ | 10/6 |
| [13] range ring | _____ | 10/7 |
| [14] point of closest approach | _____ | 10/8 |
| [15] turn status | _____ | 10/9 |
| [16] resolution command | _____ | 10/10 |

ATARS provides traffic advisories and resolution advisories. How would you evaluate the relative contribution of these two services in maximizing your safety? For example 50-50, 2 to 1, 1 to 10, or what?

- [17] Traffic Advisory: Resolution Advisory : _____
Line 11/Entry 3

- [18] Did the information in the traffic advisory prompt you to take avoidance maneuvers prior to receiving a resolution advisory?

Never _____

Sometimes _____

Often _____

Always _____

Line 11/Entry 5

- [19] How confident were you of the advisability of these maneuvers?

Not at all _____

Somewhat _____

Very _____

11/6

- [20] In a threat situation, did the traffic advisory service aid you in visual acquisition of the traffic?

Never _____

Sometimes _____

Often _____

Always _____

11/7

- [21] Once you had visually acquired traffic, did you:

forget about the screen. _____

continue to consult the traffic and resolution advisories _____

ignore further traffic advisories, but respond to resolution advisories _____

continue to consult traffic advisories, but ignore resolution advisories _____

11/8

(Responses contained in Flight Record)

- [22] How adequate was the traffic advisory service in preparing you for the resolution advisory?

not useful at all _____

somewhat useful _____

Line 11/Entry 9

very useful _____

- [23] How confident are you that the resolution commands maximize the miss distance.

not at all confident _____

somewhat confident _____

11/10

very confident _____

- [24] If you never see the traffic how do you feel about following the resolution advisories?

not at all confident _____

somewhat confident _____

Line 12/Entry 3

very confident _____

- [25] Please rate (0-9) how you feel about all aspects of the display format together (size, legibility, color, etc.) _____

12/4

- [26] On the whole, please rate (0-9) how you feel about ATARS service. _____

12/5

- [27] Can you suggest any mods or improvements in the display or service?

Line 13/Entries 3-10

FORM 3 - FLIGHT DEBRIEFING

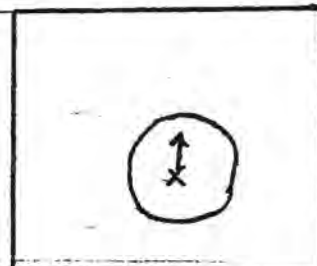
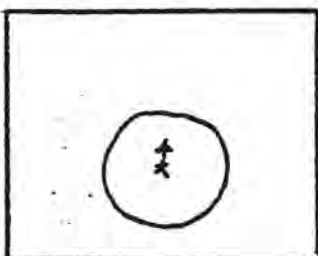
(page 3 of 3)

B-7

Line 3/Entry 4
 (3) PILOT MISSION NUMBER: 3/6
 (5) ALTITUDE MAINTENANCE: 3/8
 (7) TURBULENCE? HOW MUCH? 3/10

3/5
 (4) FLIGHT LEG (1 2 3 4) 3/7
 (6) COURSE MAINTENANCE: 3/9
 (8) WORK LOAD BEFORE INTRUSION
 Line 4/Entry 3

(9) TIME OF FIRST ADVISORY: 4/4
 (10) TIME PILOT NOTES ADVISORY: 4/5
 (11) STAGE PILOT NOTES ADVISORY(P TH R) 4/6
 (12) TIME OF VISUAL ACQUISITION: 4/7
 (13) IF ONE WAS IT PLANNED? 4/8
 (14) ADVISORY TYPE(P TH RES) 4/9
 (15) INTRUSION TYPE(HO PU TC) 4/10
 (16) IF MORE THAN ONE, DRAW SYMBOLOGY:
 WAS THE MOST CRITICAL PLANNED?
 Line 5/Entry 3
 (17) TRACK INTRUSION:



(18) PROX THREAT RES AD

OCCURS (time)			
MANEUVER(Y/N)			

see Appendix C,
 Encounter Record Format
 Lines 7, 8, and 9.

(19) ON SCREEN RES MANEUVER TAKEN

TYPE MANEUVER (CLI,DES,RIGHT,LEFT)		
RATE (BANK OR FT/MIN)		
COURSE CHANGE (FEET--DEGREES)		

Lines
 10, 11
 and

(20) DOES PILOT HEAR THREAT? 5/4
 (21) TYPE COMMAND RECEIVED: Lines 13 and 14
 (22) DOES PILOT HEAR CLEAR? 5/5
 (23) TIME BACK ON COURSE: 5/6
 (24) CRITICAL EVENTS?(E.G.OTHER TRAFFIC) 5/7
 (25) ADVISORY TIMING -- TOO SOON ____ ABOUT RIGHT ____ TOO LATE ____ 5/8
 (26) RESOLUTION: CORRECT ____ NOT CORRECT ____ DON'T KNOW ____ 5/9

FORM 4 - ENCOUNTER LOG

(Responses contained
 in Encounter Record)

(page 1 of 2)

B-1

RESPONSE CHECK LIST: (Responses contained
in Encounter Record)
(ALL RATING SCALES 0-9)

- [30] _____ ALTITUDE DURING INTRUSION (RANGE IN FT.) Line 5/Entry 10
- [31] _____ COURSE DURING INTRUSION (0 - 9) _____ Line 6/Entry 3
- [32] _____ MAINTAIN INSTRUMENT SCAN (Y/N) _____ 6/4
- [33] _____ MAINTAIN EXTERNAL SCAN (Y/N) _____ 6/5
- [34] _____ MANEUVER COORDINATION (0 - 9) _____ 6/6
- [35] _____ AIRSPEED CONTROL (0 - 9) _____ 6/7
- [36] _____ FUEL MANAGEMENT (OK / NG) LAST INTRUSION ONLY - 6/8
- [37] _____ PROP SYNC (OK / NG) _____ 6/9
- [38] _____ WORKLOAD RATING (0 - 9) _____ 6/10

- [1] Intrusion Number: Line 15/Entry 4
- [2] Test Pilot ID: 15/5 [3] Pilot Mission #: 15/6
- [4] Where did the intruder come from (clock position)? 15/7
- [5] Did the display light up in time? 15/8
- [6] Did the threat advisory occur too early or too late? 15/9
- [7] Did you find ATARS useful in avoiding the traffic? 15/10
- [8] Did you maneuver before you received an advisory? Line 16/Entry 3
- If yes, why?
- [9] Did you find the resolution advisory or the display the most helpful?
- 16/4
- [10] What did you think of the resolution advisory? 16/5
- [11] Was the intruder going faster or slower than you? 16/6
- [12] Was the intruder ATARS equipped? 16/7
- [13] Was he above/below you or at same altitude? 16/8
- [14] How would you rate the workload of the intrusion (0-9)? 16/9
- [15] Would you rather have ATARS advisories or traffic controller advisories? Both? 16/10

(Responses contained in
Encounter Record)

AUTOMATIC TRAFFIC ADVISORY AND RESOLUTION SERVICE (ATARS)

SUBJECT PILOT BACKGROUND INFORMATION (GOVERNMENT EMPLOYEES ONLY)

NAME:

ROUTING SYMBOL:

BLD #:

EXTENSION:

CURRENT CERTIFICATIONS: PRIVATE _____

COMMERCIAL _____

MULTI _____

INSTRMT _____

NUMBER OF HOURS PIC _____

NUMBER OF HOURS MULTI _____

Code _____ Line 2/Entry 2

(Responses contained in
Pilot Record)

A. THE CONFIDENTIALITY OF YOUR ANSWERS IS ASSURED BY THE PRIVACY
ACT OF 1979 .

B. Age _____ 2/3

Marital Status [check one] () married, () separated,
() divorced, () widowed, () single/never married. 2/4

Number of children _____ 2/5

Type of work [e.g., engineering, administration, airplane
mechanic] _____ 2/6 Position _____

or title _____ 2/7 Number of _____

years employed there _____ 2/8 Education _____

[check one] () graduated high school, () some college,
() graduated from 2 year college, () graduated from 4
year college, () some graduate school, () advanced
degree, (M.A. or Ph.D.), () trade/vocational training.

2/9

C. First private license [month/year] _____ / _____ Line 2/Entry 10

Date of last bi-annual flight check _____ 2/11

Date of last medical _____ 2/12

Medical certificate class _____ 2/13

Date of last audiogram: _____ [] None 2/14

Date of last orthorater: _____ [] None 2/15

D. 1. Ratings [check all appropriate]

() Private 2/16

() Commercial 2/17

() Instrument 2/18

() CFI 2/19

() CFII 2/20

() ATP 2/21

2. Aircraft type [check all appropriate]

() Single engine 2/22

() Single engine (complex) 2/23

() Multi-engine 2/24

() Rotorcraft 2/25

() Turbine Line 3/Entry 2

E. Total Number of Hours [PIC]

Number of hours IFR [VFR weather] _____ 3/3

Number of hours IFR [gauges] _____ 3/4

Number of hours military experience _____ 3/5

F. Breakdown of total number of hours [PIC]

1. Number of hours in

Last month _____ Line 3/Entry 6

Last three months _____ 3/7

Last six months _____ 3/8

Last twelve months _____ 3/9

2. Number of hours [PIC] in

Single engine [overall/last 12 months] _____ 3/10 & 3/11

Single engine, complex [overall/last 12 months] _____ 3/12 & 3/13

Multi-engine [overall/last 12 months] _____ 3/14 & 3/15

Subject aircraft _____ 3/16

3. Number of hours [PIC]

Day _____ 3/17

Night _____ 3/18

G. Simulator experience, list type of simulator and hours.

Simulator _____ 3/19 Hours _____ 3/20

Experience with experimental aircraft and, advanced avionics, list type and hours.

Type _____ 3/21 Hours _____ 3/22

H. Membership in aviation clubs, societies, professional associations: Line 3/Entry 23

Aviation awards:

3/24

I. Any incidents (list short name) or accidents (short description)?

Incidents: 3/25

Accidents: 3/26

ATARS GROUND SCHOOL - Test #1

(Correct responses are circled)

1. Which of the following might occur a minute or more before point of closest approach?

- 1) Proximate advisory
- 2) Traffic threat advisory
- 3) Resolution advisory

Lines 4 & 5/Entry 2

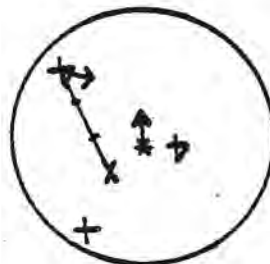
- ④ Both 1 and 2

2. If you choose to ignore a resolution advisory, and decide to maneuver at your own discretion:

- 1) Your ATARS display will automatically shutdown leaving you to rely on manual resolution of traffic conflicts.
- 2) You will have violated FAA regulations.
- 3) The probability of in-flight conflict decreases.

- ④ None of the above.

4 & 5/3



3. Upon evaluating the traffic situation depicted above which aircraft is(are) the most critical threat(s)?

- 1) The aircraft at 3 o'clock.
- 2) The aircraft at 3 o'clock and 10 o'clock.
- 3) The aircraft at 7 o'clock.

4 & 5/4

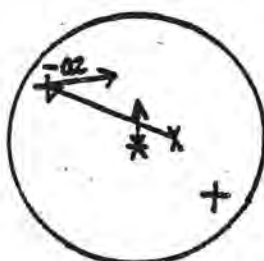
- ④ The aircraft at 10 o'clock.

(Responses contained in Pilot Record)

4. Which of the following is false?

- 1) The threatening aircraft is 200 feet below you.
- ② The threatening aircraft is climbing.
- 3) The most threatening intruder is located at 10 o'clock.
- 4) The large "X" represents the point of closest approach.

Lines 4 & 5/Entry 5



5. Which of the following is false?

- 1) A proximity advisory may suggest limits on possible maneuvers.
- 2) A proximity advisory may at any time become a threat advisory.
- ③ Proximate aircraft are never displayed when a critical threat appears.
- 4) Proximate aircraft advisories occur with any altitude separation of less than 2000 feet and range less than 2 nautical miles.

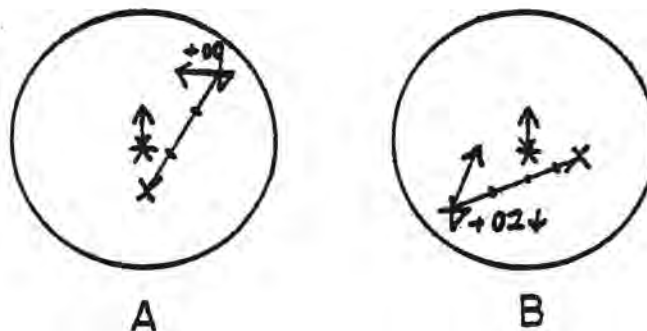
4 & 5/6

6. The symbol 'A' means:

- 1) The aircraft is ATARS equipped.
- ② The aircraft is controlled by ATC.
- 3) The aircraft is a threat.
- 4) None of the above.

4 & 5/7

7. If your screen is clear (no traffic), the ATARS display will alert you to the presence of a threat by:
- 1) Displaying the relevant symbols on your screen.
 - 2) Emitting a 'beep-beep' every 4.7 seconds. Lines 4 & 5/Entry 8
 - 3) Emitting a synthesized voice warning 'threat'.
 - ④ Both 1. and 3.



8. Upon evaluating the two separate situations above, one can conclude that:
- ① In situation B the threatening aircraft will pass behind you.
 - 2) In situation A the threatening aircraft will pass in front of you. 4 & 5/9
 - 3) In both situations the altitude of the threatening aircraft is identical to yours.
 - 4) In both situations the estimated point of closest approach will occur in 30 seconds.

Given a threatening aircraft at 12 o'clock with the following properties:

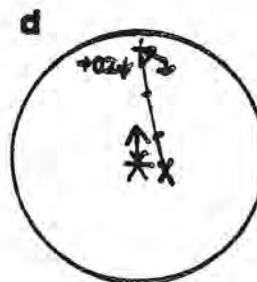
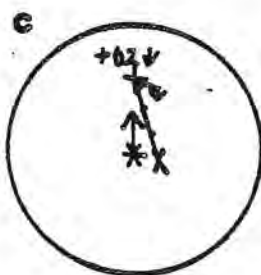
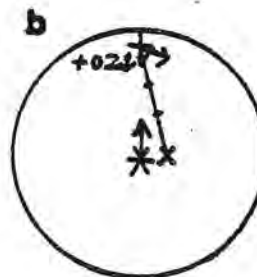
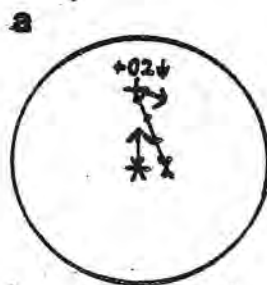
- o velocity is less than yours.
- o aircraft is 200 feet above you and descending.
- o range is 1.8 nm.
- o aircraft is turning.

(Responses contained
in Pilot Record)

9. Which figure will appear on your ATARS display?

- 1) Figure a
- 2) Figure b
- 3) Figure c
- ④ Figure d

Lines 4 & 5/Entry 10



10. All simultaneous threats will:

- 1) be represented by green target symbols.
- 2) be supplied with relative motion lines.
- 3) cause a resolution advisory to be displayed.
- ④ be represented by a red "X".

4 & 5/11

11. A resolution advisory will:
- 1) occur several minutes before the time of closest approach.
 - 2) compel the pilot to take the recommended evasive action.
 - ③ typically occur at most 30-40 seconds before the time of closest approach.
 - 4) never occur when you really need it. Lines 4 & 5/Entry 12
12. A yellow circle centered on the asterisk representing your own aircraft:
- 1) defines a range of 4 nautical miles.
 - 2) defines a range within which an intruder will be identified as threatening.
 - ③ defines a range of 2 nautical miles. 4 & 5/13
 - 4) defines the advisory picture area.
13. Proximate aircraft which fall outside of the advisory picture area:
- 1) cannot be displayed by ATARS. 4 & 5/14
 - 2) will be represented by an "X" at the appropriate bearing and at the edge of the picture area.
 - 3) will be represented by a green triangle which will always appear at the lower left of the picture area.
 - ④ will be represented by a green triangle at the appropriate bearing and at the edge of the picture area.
14. Which symbol within the advisory picture area provides a graphic display of threatening traffic?
- 1) a green "+"
 - 2) a yellow asterisk 4 & 5/15
 - 3) a red "+"
 - ④ a red "v"

(Responses contained
in Pilot Record)

15. When a red '+02' symbol appears next to a traffic symbol:

- 1) a threatening aircraft is located 200 feet below you.
- 2) a proximate aircraft is located 200 feet below you.
- 3) a threatening aircraft is located 20 feet above you.
- ④) a threatening aircraft is located 200 feet above you.

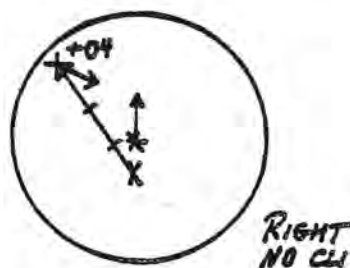
Lines 4 & 5/
Entry 16

16. An up (↑) or down (↓) arrow is displayed next to the altitude information to tell you:

- 1) whether your separation from the aircraft is increasing or decreasing.
- ②) the direction of vertical movement of a threatening aircraft.
- 3) the predicted point of closest approach.
- 4) the direction of vertical movement of proximate or threatening aircraft.

4 & 5/17

For questions 17, 18, and 19, refer to the Figure below.



17. The symbol which depicts the present position of your plane is:

- 1) "+"
- 2) "+04 "
- ③) "*"
- 4) "X"

4 & 5/18

18. The predicted point of closest approach of the threat is represented by:

1) *

Lines 4 & 5/Entry 19

2) Right
NO CLI

③) 'X'

4) 

19. The symbol that depicts a threatening aircraft, its relative motion, course, and point of closest approach is:

1) 

4 & 5/20

2) +04



20. In general, fast moving threats have:

1) short course arrows.

②) relative motion lines angled closer to their course arrows than slow moving threats.

4 & 5/21

3) relative motion lines angled farther away from their course arrows than slow moving threats.

4) blinking threat symbols.

ATARS GROUND SCHOOL - Test #2

(Correct responses are circled)

1. Which of the following would normally not occur more than 40 seconds before point of closest approach?

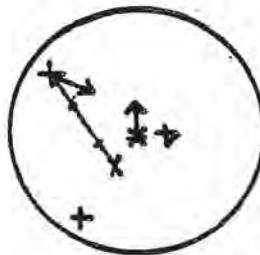
- 1) Proximate advisory
- 2) Traffic threat advisory
- ③ Resolution advisory
- 4) Both 1 and 2

Lines 4 & 5/Entry 2

2. If you choose to ignore a resolution advisory, and decide to maneuver at your own discretion:

- 1) Your ATARS display will automatically shutdown leaving you to rely on manual resolution of traffic conflicts.
- 2) You will have violated FAA regulations.
- ③ The probability of in-flight conflict may increase.
- 4) None of the above.

4 & 5/3



3. Upon evaluating the traffic situation depicted above which aircraft is(are) the least critical threat(s)?

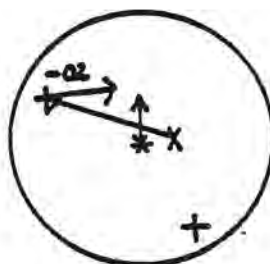
- ① The aircraft at 3 o'clock.
- 2) The aircraft at 3 o'clock and 10 o'clock.
- 3) The aircraft at 7 o'clock.
- 4) The aircraft at 10 o'clock.

4 & 5/4

4. Which of the following is true? (Refer to Figure below).

- 1) The threatening aircraft is 200 feet above you.
- 2) The threatening aircraft is climbing.
- 3) The most threatening intruder is located at 5 o'clock.
- ④ The large "X" represents the point of closest approach.

Lines 4 & 5/Entry 5



5. Which of the following is true?

- ① A proximity advisory may suggest limits on possible maneuvers.
- 2) Proximate aircraft are displayed because they always become a threat.
- 3) Proximate aircraft are never displayed when a critical threat appears.
- 4) Proximate aircraft advisories occur with any altitude separation of less than 4000 feet and range less than 2 nautical miles.

4 & 5/6

6. The symbol 'A' means:

- 1) The aircraft is not ATARS equipped.
- 2) The aircraft is controlled by ATC.
- ③ The aircraft is a threat.
- 4) None of the above.

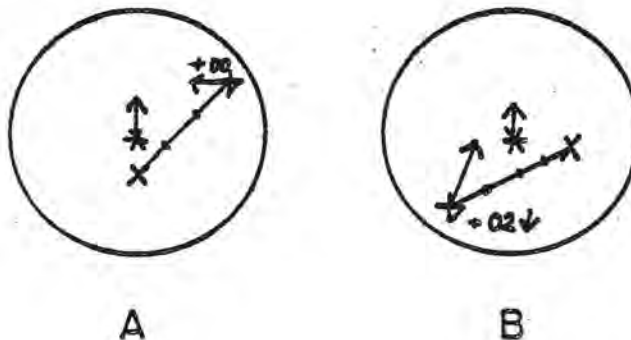
4 & 5/7

(Responses contained
in Pilot Record)

7. If your screen is clear (no traffic), the ATARS display will alert you to the presence of a proximate aircraft by:

- ① Displaying the relevant symbols on your screen.
- 2) Emitting a 'beep-beep' every 4.7 seconds.
- 3) Emitting a synthesized voice warning 'proximate'.
- 4) Both 1 and 3.

Lines 4 & 5/Entry 8



8. Upon evaluating the two separate situations above, one can conclude that:

- 1) In situation B the threatening aircraft will pass in front of you.
- 2) In situation A the threatening aircraft will pass in front of you.
- 3) In both situations the altitude of the threatening aircraft is identical to yours.
- ④ In both situations the estimated point of closest approach will occur at different times.

4 & 5/9

Given a threatening aircraft at 12 o'clock with the following properties:

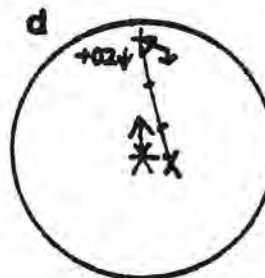
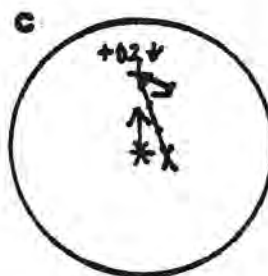
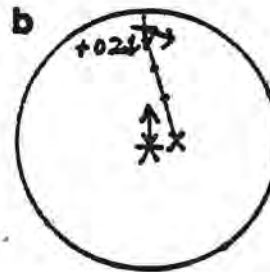
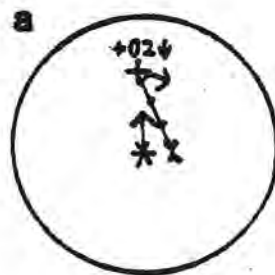
- o velocity is less than yours.
- o aircraft is 200 feet above you and descending.
- o range is 1.8 nm.
- o aircraft is turning.

(Responses contained
in Pilot Record)

9. Which figure will appear on your ATARS display?

- 1) Figure a
- 2) Figure b
- 3) Figure c
- ④) Figure d

Lines 4 & 5/Entry 10



10. All simultaneous threats will:

- ①) be represented by red target symbols.
- 2) be supplied with relative motion lines.
- 3) cause a resolution advisory to be displayed.
- 4) be represented by a green "7".

4 & 5/11

(Responses contained
in Pilot Record)

11. A threat advisory will:

- 1) occur several minutes before the time of closest approach.
- 2) compel the pilot to take evasive action. Lines 4 & 5/Entry 12
- 3) typically occur at most 30-40 seconds before the time of closest approach.
- ④ typically occur at most one minute before the time of closest approach.

12. A yellow circle centered on the asterisk representing your own aircraft:

- 1) defines a range of 4 nautical miles.
- 2) defines a range within which an intruder will be identified as threatening.
- ③ defines a range of 2 nautical miles. 4 & 5/13
- 4) defines the advisory picture area.

13. Threat aircraft which fall outside of the advisory picture area:

- 1) cannot be displayed by ATARS. 4 & 5/14
- 2) will be represented by an "X" at the appropriate bearing and at the edge of the picture area.
- 3) will be represented by a red triangle which will always appear at the lower left of the picture area.
- ④ will be represented by a red triangle at the appropriate bearing and at the edge of the picture area.

14. Which symbol within the advisory picture area provides a graphic display of proximate traffic?

- ① a green "+" 4 & 5/15
- 2) a yellow asterisk
- 3) a red "+"
- 4) a red "

15. When a green '+02' symbol appears next to a traffic symbol:

- 1) a threatening aircraft is located 200 feet below you.
- ② a proximate aircraft is located 200 feet above you.
- 3) a proximate aircraft is located 20 feet above you.
- 4) a threatening aircraft is located 200 feet above you.

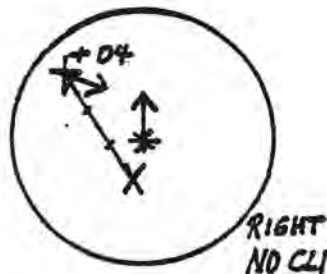
Lines 4 & 5/
Entry

16. An up (↑) or down (↓) arrow is displayed next to the altitude information to tell you:

- 1) whether your separation from the aircraft is increasing or decreasing.
- 2) the direction of vertical movement of a proximate aircraft
- 3) the direction of vertical movement of proximate or threatening aircraft.
- ④ none of the above

4 & 5/17

For questions 17, 18, and 19, refer to the Figure below.



17. The symbol which depicts the present position of your plane is:

- 1) "+"
- 2) "+04 "
- ③ "*" (with an arrow pointing up)
- 4) "+" (with an arrow pointing up)

4 & 5/18

(Responses contained in Pilot Record)

18. The predicted point of closest approach of the threat is represented by:

1) *

Lines 4 & 5/Entry 19

2) Right
NO CLI

③) 'X'

4) 

19. The symbol that depicts a threatening aircraft, its relative motion, course, and point of closest approach is:

1) 

4 & 5/20

2) +04

③) 

4)

20. In general, slow moving threats have:

4 & 5/21

1) long course arrows.

2) relative motion lines angled closer to their course arrows than fast moving threats.

③) relative motion lines angled farther away from their course arrows than fast moving threats.

4) blinking threat symbols.

ATARS GROUND SCHOOL - Test #3

(Responses contained
in Pilot Record)

(Correct responses are circled)

1. Which of the following might occur several minutes before point of closest approach?

- 1) Proximate advisory
- 2) Traffic threat advisory
- 3) Resolution advisory

Lines 4 & 5/Entry 2

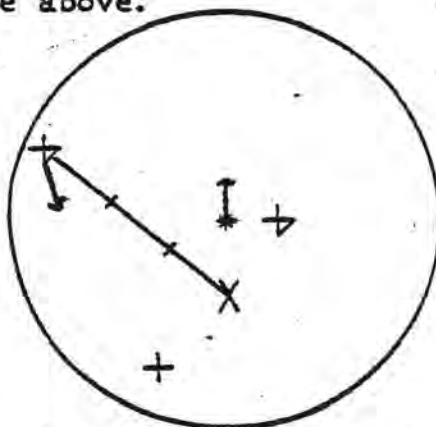
- ④ Both 1 and 2

2. If you choose to ignore a resolution advisory, and decide to maneuver at your own discretion:

- 1) Your ATARS display will automatically shutdown leaving you to rely on manual resolution of traffic conflicts.
- 2) You will have violated FAA regulations.
- 3) The probability of in-flight conflict decreases.

4 & 5/3

- ④ None of the above.



3. Upon evaluating the traffic situation depicted above which aircraft is(are) the most critical threat(s)?

- 1) The aircraft at 3 o'clock.
- 2) The aircraft at 3 o'clock and 10 o'clock.
- 3) The aircraft at 7 o'clock.

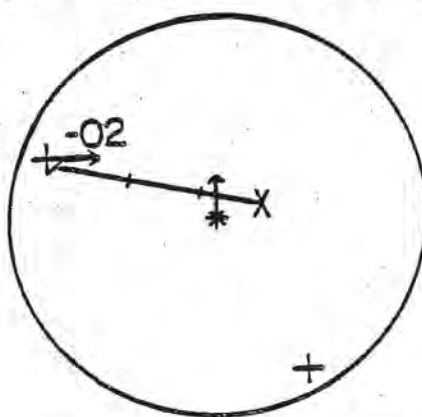
4 & 5/4

- ④ The aircraft at 10 o'clock.

(Responses contained in Pilot Record)

4. Which of the following is false?

- 1) The threatening aircraft is 200 feet below you.
- ② The threatening aircraft is climbing.
- 3) The most threatening intruder is located at 10 o'clock.
- 4) The large "X" represents the point of closest approach.



Lines 4 & 5/Entry 5

5. Which of the following is false?

- 1) Proximate aircraft are displayed because they set limits on possible maneuvers to avoid or resolve a conflict.
- 2) Proximate aircraft are displayed because they can at any time, become a threat.
- ③ Proximate aircraft are never displayed when a critical threat appears.
- 4) Proximate aircraft advisories occur with any altitude separation of less than 2000 feet and range less than 2 nautical miles.

4 & 5/6

6. The symbol $\oplus$ means:

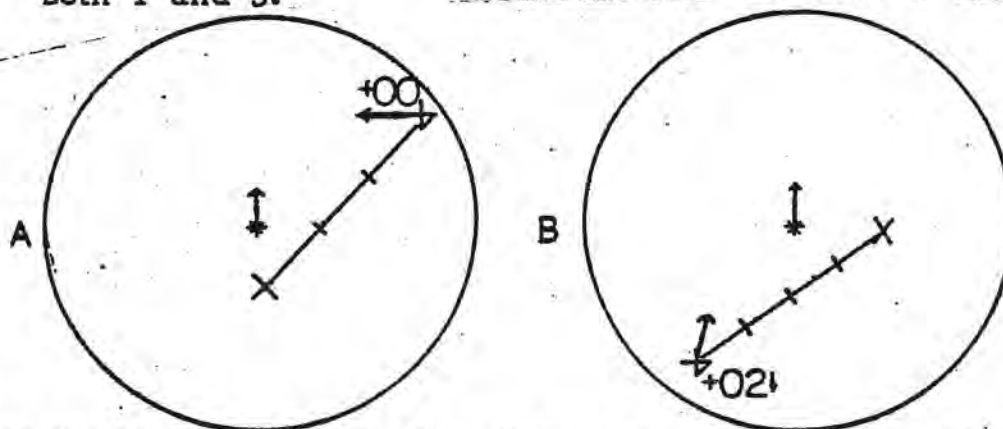
- 1) The aircraft is ATARS equipped.
- ② The aircraft is controlled by ATC.
- 3) The aircraft is a threat.
- 4) None of the above.

4 & 5/7

7. If your screen is clear (no traffic), the ATARS display will alert you to the presence of a threat by:

- 1) Displaying the relevant symbols on your screen.
- 2) Emitting a 'beep-beep' every 4.7 seconds.
- 3) Emitting a synthesized voice warning 'threat'.
- ④ Both 1 and 3.

Lines 4 & 5/Entry 8



8. Upon evaluating the two separate situations above, one can conclude that:

- ① In situation B the threatening aircraft will pass behind you.
- 2) In situation A the threatening aircraft will pass in front of you.
- 3) In both situations the altitude of the threatening aircraft is identical to yours.
- 4) In both situations the estimated point of closest approach will occur in 30 seconds.

4 & 5/9

Given a threatening aircraft at 12 o'clock with the following properties:

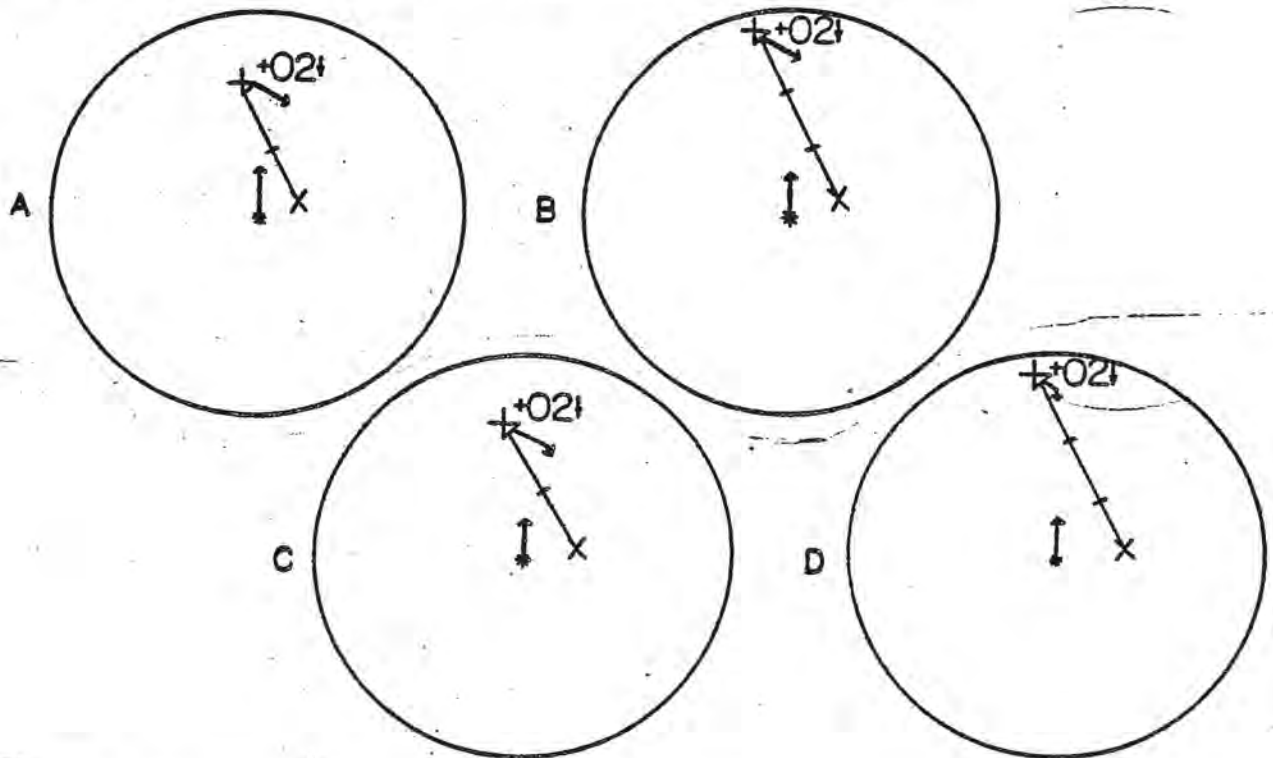
- o velocity is less than yours.
- o aircraft is 200 feet above you and descending.
- o range is 2 nm.
- o aircraft is turning.

(Responses contained in Pilot Record)

9. Which figure will appear on your ATARS display?

- 1) Figure a
- 2) Figure b
- 3) Figure c
- ④ Figure d

Lines 4 & 5/Entry 10



10. All simultaneous threats will:

- 1) be represented by green target symbols.
- 2) be supplied with relative motion lines.
- 3) cause a resolution advisory to be displayed.
- ④ be represented by a blue "4".

4 & 5/11

11. A resolution advisory will:

- 1) occur several minutes before the time of closest approach.
- 2) compel the pilot to take the recommended evasive action.
- ③ typically occur at most 30-40 seconds before the time of closest approach.
- 4) never occur when you really need it.

Lines 4 & 5/Entry 1

12. A yellow circle centered on the asterisk representing your own aircraft:

- 1) defines a range of 4 nautical miles.
- 2) defines a range within which an intruder will be identified as threatening.
- ③ defines a range of 2 nautical miles.
- 4) defines the advisory picture area.

4 & 5/13

13. Proximate aircraft which fall outside of the advisory picture area:

- 1) cannot be displayed by ATARS.
- 2) will be represented by an "X" at the appropriate bearing and at the edge of the picture area.
- 3) will be represented by a green triangle which will always appear at the lower left of the picture area.
- ④ will be represented by a green triangle at the appropriate bearing and at the edge of the picture area.

4 & 5/14

14. Which symbol within the advisory picture area provides a graphic display of threatening traffic?

- 1) a green "⋈"
- 2) a yellow asterisk
- 3) a blue "⋈"
- ④ a blue "⋈"

4 & 5/15

(Responses contained in Pilot Record)

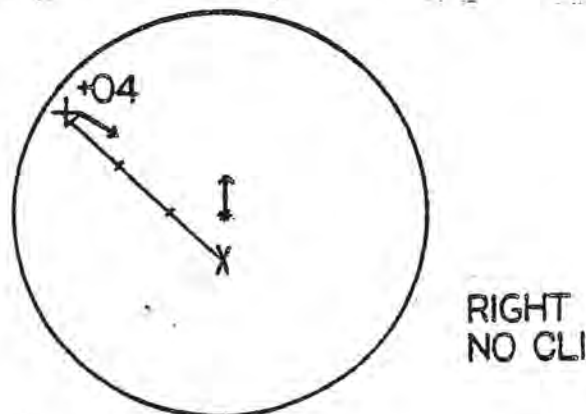
15. When a blue '+02' symbol appears next to a traffic symbol:

- 1) a threatening aircraft is located 200 feet below you. Lines 4 & 5/
- 2) a proximate aircraft is located 200 feet below you. Entry 16
- 3) a threatening aircraft is located 20 feet above you.
- ④ a threatening aircraft is located 200 feet above you.

16. An up (↑) or down (↓) arrow is displayed next to the altitude information to tell you:

- 1) whether your separation from the aircraft is increasing or decreasing. 4 & 5/17
- ② the direction of vertical movement of a threatening aircraft.
- 3) the predicted point of closest approach.
- 4) the direction of vertical movement of proximate or threatening aircraft.

For questions 17, 18, and 19, refer to the Figure below.



17. The symbol which depicts the present position of your plane is:

- 1) "⊕" 4 & 5/18
- 2) "+04 "
- ③ "*"
- 4) "⊕"

FORM 7C - GROUND SCHOOL EXAM-VERSION 3

18. The predicted point of closest approach of the threat is represented by:

1) *

Lines 4 & 5/Entry 19

2) Right
NO CLI

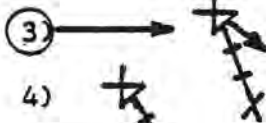
③) 'X'

4) 

19. The symbol that depicts a threatening aircraft, its relative motion, course, and point of closest approach is:

1) 

2) +04

③) 

4 & 5/20

4) 

20. Fast moving threats have:

1) short course arrows.

②) relative motion lines angled close to their course arrows.

4 & 5/21

3) relative motion lines angled far away from their course arrows.

4) blinking threat symbols.

APPENDIX C

DATABASE INDEXED TO DATA COLLECTION FORMS AND DESCRIPTION OF CODING DEFINITIONS

This appendix indexes the flight records, encounter records, and pilot records to the data collection forms (shown in Appendix B), and defines the coding systems used to input the responses to the items on these forms into the database. This appendix is divided into the following five sections:

	PAGE
Designation of Database Entries for Flight Records	C- 3
Designation of Database Entries for Encounter Records	C- 6
Designation of Database Entries for Pilot Records	C-10
Coding Definitions for Text Responses from Flight Debriefings	C-13
Coding Definitions for Maneuvers and Resolution Advisories	C-14

Each location in the three data records (specified by "Line" number and "Entry" number) is accompanied by the "Form" number and the "Item" number on that form for which the location gives the response. The "Comments" column explains those entries that do not correspond to a question from the data collection forms (e.g. line numbers), and gives the coding definition for the responses to the data collection form items. This column is blank when the coding definition for a particular question is explicitly determined by the question (e.g. a 0-9 rating scale). The coding definitions

for subject Pilot maneuvers and issued resolution advisories are presented separately at the end of this appendix.

The database entries which correspond to the Form 1 questions (Preflight Exam) do not represent the subject Pilot's actual responses; they represent whether the subject Pilot's response was correct, partially correct, or wrong.

Some entries are labeled "Not used" or "Set to..." either because they were never assigned, or because other than one particular response to the question would make the presence of that flight's data in the database illogical (for instance, any response but "No" to the question "Was the flight aborted?").

DESIGNATION OF DATABASE ENTRIES FOR FLIGHT RECORDS.

LINE	ENTRY	FORM	ITEM	COMMENTS
1	1	---	---	Flag for start of Flight Record (=11111)
2	1	---	---	Flight number (preceded by 'F')
2	2	---	---	Subject pilot identification number
2	3	---	---	Date
2	4	---	---	Number of encounters in this flight
2	5	---	---	Average difference between times reported by the observer and times reported by the system data extraction for the same events during this flight
2	6	---	---	Number of lines to follow in this flight
3	1	---	---	Line number
3	2	---	---	Form number (=1)
3	3	---	---	Subject pilot identification number
3	4	---	---	Subject pilot's flight number (1 - 6)
3	5	---	---	Date
3	6	1	1	0=Wrong, 1=Partially correct, 2=Correct
3	7	1	2	0=Wrong, 1=Partially correct, 2=Correct
3	8	1	3	0=Wrong, 1=Partially correct, 2=Correct
3	9	1	4	0=Wrong, 1=Partially correct, 2=Correct
3	10	1	5	0=Wrong, 1=Partially correct, 2=Correct
4	1	---	---	Line Number
4	2	---	---	Form number (=1)
4	3	1	6	0=Wrong, 1=Partially correct, 2=Correct
4	4	1	7	0=Wrong, 1=Partially correct, 2=Correct
4	5	1	8	0=Wrong, 1=Partially correct, 2=Correct
4	6	1	9	0=Wrong, 1=Partially correct, 2=Correct
4	7	---	---	Not used (set =0)
4	8	---	---	Not used (set =0)
4	9	---	---	Not used (set =0)
4	10	---	---	Not used (set =0)
5	1	---	---	Line number
5	2	---	---	Form number (=2)
5	3	---	---	Observer identification numbers (two 3-digit numbers separated by a zero)
5	4	2	1	Date (MMDDYY)
5	5	2	2	Time (HHMMSS)
5	6	2	3	
5	7	2	4	
5	8	2	5	
5	9	2	6	Two 3-digit numbers separated by a zero
5	10	2	7	A=1, B=2, C=3, D=4, E=5, F=6
6	1	---	---	Line number
6	2	---	---	Form number
6	3	2	8	1=272A, 2=C172 (Tail numbers)
6	4	2	9	1=732VG, 2=N50 (Tail numbers)
6	5	2	10	Equal to zero (OK) for all flights in database
6	6	2	11	
6	7	2	12	Hundreds of feet (999=Clear)
6	8	2	13	Nautical miles

DESIGNATION OF DATABASE ENTRIES FOR FLIGHT RECORDS (cont.)

LINE	ENTRY	FORM	ITEM	COMMENTS
6	9	2	14	0=None, 1=Haze, 2=Fog, 3=Cloudy, etc.
6	10	2	15	Farenheit (-99=Missing response)
7	1	---	---	Line number
7	2	---	---	Form number (=2)
7	3	2	16	Farenheit (-99=Missing response)
7	4	2	17	Degrees
7	5	2	18	Knots
7	6	2	19	Hundredths of inches of mercury
7	7	2	20	4 digits; 2 MSD's are direction in tens of degrees, 2 LSD's are wind speed in knots
7	8	2	21	6 digits (HHMMSS)
7	9	2	22	Equal to 0 (No abort) in all flights in database
7	10	2	23	0=No, 1=Yes
8	1	---	---	Line number
8	2	---	---	Form number (=2)
8	3	2	24	6 digits (HHMMSS, 999999=Not started)
8	4	2	25	6 digits (HHMMSS)
8	5	2	26	Hundreds of feet
8	6	2	27	Nautical miles
8	7	2	28	3 digit code
8	8	---	---	Not used (set =0)
8	9	---	---	Not used (set =0)
8	10	---	---	Not used (set =0)
9	1	---	---	Line number
9	2	---	---	Form number (=3)
9	3	3	1	
9	4	3	2	
9	5	3	3	0=No good, 1=OK
9	6	3	4	0=No, 1=Yes
9	7	3	5	0=No, 1=Yes
9	8	3	6	
9	9	3	7	
9	10	3	8	
10	1	---	---	Line number
10	2	---	---	Form number (=3)
10	3	3	9	
10	4	3	10	
10	5	3	11	
10	6	3	12	
10	7	3	13	
10	8	3	14	
10	9	3	15	
10	10	3	16	
11	1	---	---	Line number
11	2	---	---	Form number (=3)
11	3	3	17	Relative evaluation of Traffic Advisory versus Resolution Advisory; 4 digit number; 2 MSD's concern Traffic Advisory, 2 LSD's concern

DESIGNATION OF DATABASE ENTRIES FOR FLIGHT RECORDS (cont.)

LINE	ENTRY	FORM	ITEM	COMMENTS
				Resolution Advisory
11	4	---	---	Not used (set to latter half of entry 3)
11	5	3	18	1=Never, 2=Sometimes, 3=Often, 4=Always
11	6	3	19	1=Not at all, 2=Sometimes, 3=Very
11	7	3	20	1=Never, 2=Sometimes, 3=Often, 4=Always
11	8	3	21	1=Forget about the screen, 2=Continue to consult the traffic and resolution advisories, 3=Ignore further traffic advisories, but respond to resolution advisories, 4=Continue to consult traffic advisories, but ignore resolution advisories
11	9	3	22	1=Not useful at all, 2=Somewhat useful, 3=Very useful
11	10	3	23	1=Not at all confident, 2=Somewhat confident, 3=Very confident
12	1	---	---	Line number
12	2	---	---	Form number (=3)
12	3	3	24	1=Not at all confident, 2=Somewhat confident, 3=Very confident
12	4	3	25	
12	5	3	26	
12	6	---	---	Not used (set =0)
12	7	---	---	Not used (set =0)
12	8	---	---	Not used (set =0)
12	9	---	---	Not used (set =0)
12	10	---	---	Not used (set =0)
13	1	---	---	Line number
13	2	---	---	Form number (=3)
13	3	3	27	Text comments (see below for coding)
13	4	3	27	Text comments (see below for coding)
13	5	3	27	Text comments (see below for coding)
13	6	3	27	Text comments (see below for coding)
13	7	3	27	Text comments (see below for coding)
13	8	3	27	Text comments (see below for coding)
13	9	3	27	Text comments (see below for coding)
13	10	3	27	Text comments (see below for coding)
14	1	---	---	Flag for end of flight record (=22222)

DESIGNATION OF DATABASE ENTRIES FOR ENCOUNTER RECORDS.

LINE	ENTRY	FORM	ITEM	COMMENTS
1	1	---	---	Flag for start of encounter record (=33333)
2	1	---	---	Encounter number (Preceded by "E")
2	2	---	---	Subject pilot identification number
2	3	---	---	Flight number
2	4	---	---	Number of surveillance records to follow
2	5	---	---	Chronological Observation number (Preceded by "O")
3	1	---	---	Line number
3	2	---	---	Form number (=4)
3	3	---	---	Observer identification numbers; two 3-digit numbers separated by a zero
3	4	4	1	
3	5	4	2	
3	6	4	3	(1-6)
3	7	4	4	(1-4)
3	8	4	5	0-9 ratings scale
3	9	4	6	0-9 ratings scale
3	10	4	7	0-9 ratings scale
4	1	---	---	Line number
4	2	---	---	Form number (=4)
4	3	4	8	0-9 ratings scale
4	4	4	9	6 digits (HHMMSS)
4	5	4	10	6 digits (HHMMSS, 999999=Never saw)
4	6	4	11	1=Proximate, 2=Threat, 4=Resolution Advisory
4	7	4	12	6 digits (HHMMSS, 999999=Never saw)
4	8	4	13	0=More than one, 1=Planned, 2=Unplanned
4	9	4	14	1=Proximate, 2=Threat, 4=Resolution Advisory, combinations take the sum
4	10	4	15	1=Head-on, 2=Lateral, 3=Tail-chase
5	1	---	---	Line number
5	2	---	---	Form number (=4)
5	3	4	16	0=1 aircraft, 1=More than one, most critical planned, 2=More than one, most critical unplanned
5	4	4	20	0=No, 1=Yes
5	5	4	22	0=No, 1=Yes
5	6	4	23	6 digits (HHMMSS, 999999=Never left course)
5	7	4	24	0=No, 1=Other traffic, 2=Lost DABS, 3=Lost ATARS, 4=Most critical was unplanned
5	8	4	25	1=Too soon, 2=About right, 3=Too late
5	9	4	26	1=Correct, 2=Not correct, 3=Not applicable
5	10	4	30	Hundreds of feet
6	1	---	---	Line number
6	2	---	---	Form number (=4)
6	3	4	31	0-9 ratings scale
6	4	4	32	0=No, 1=Yes
6	5	4	33	0=No, 1=Yes
6	6	4	34	0-9 ratings scale
6	7	4	35	0-9 ratings scale

DESIGNATION OF DATABASE ENTRIES FOR ENCOUNTER RECORDS (cont.)

LINE	ENTRY	FORM	ITEM	COMMENTS
6	8	4	36	0=No good, 1=OK
6	9	4	37	0=No good, 1=OK
6	10	4	38	0-9 rating scale
7	1	---	---	Line number
7	2	---	---	Form number (=4)
7	3	---	---	Question number (=18)
7	4	---	---	Encounter number
7	5	4	18	Advisory type; 1=Proximate, 2=Threat, 4=Resolution Advisory
7	6	4	18	Time at which advisory occurs (HHMMSS)
7	7	4	18	0=Subject pilot did not maneuver in response to advisory, 1=Subject pilot did maneuver in response to advisory
7	8	4	18	Not used (set=-999999)
7	9	4	18	Not used (set=-999999)
7	10	4	18	Not used (set=-999999)
8	1	---	---	Line number
8	2	---	---	Form number (=4)
8	3	---	---	Question number (=18)
8	4	---	---	Set to encounter number if more than one advisory type present
8	5	4	18	Advisory type; 1=Proximate, 2=Threat, 4=Resolution Advisory
8	6	4	18	Time at which advisory occurs (HHMMSS)
8	7	4	18	0=Subject pilot did not maneuver in response to advisory, 1=Subject pilot did maneuver in response to advisory
8	8	4	18	Not used (set=-999999)
8	9	4	18	Not used (set=-999999)
8	10	4	18	Not used (set=-999999)
9	1	---	---	Line number
9	2	---	---	Form number (=4)
9	3	---	---	Question number (=18)
9	4	---	---	Set to encounter number if all three types of advisory present
9	5	4	18	Advisory type; 1=Proximate, 2=Threat, 4=Resolution Advisory
9	6	4	18	Time at which advisory occurs (HHMMSS)
9	7	4	18	0=Subject pilot did not maneuver in response to advisory, 1=Subject pilot did maneuver in response to advisory
9	8	4	18	Not used (set=-999999)
9	9	4	18	Not used (set=-999999)
9	10	4	18	Not used (set=-999999)
10	1	---	---	Line number
10	2	---	---	Form number (=4)
10	3	---	---	Question number (=19)
10	4	---	---	Encounter number
10	5	4	19	Type of maneuver taken (see below for code)

DESIGNATION OF DATABASE ENTRIES FOR ENCOUNTER RECORDS (cont.)

LINE	ENTRY	FORM	ITEM	COMMENTS
10	6	4	19	Bank angle of maneuver (degrees)
10	7	4	19	Horizontal course change (feet)
10	8	4	19	Rate of climb/descent (ft/min)
10	9	4	19	Altitude change (feet)
10	10	---	---	Set to -1 if maneuver present
11	1	---	---	Line number
11	2	---	---	Form number (=4)
11	3	---	---	Question number (=19)
11	4	---	---	Set to encounter number if more than one maneuver taken
11	5	4	19	Type of maneuver taken (see below for code)
11	6	4	19	Bank angle of maneuver (degrees)
11	7	4	19	Horizontal course change (feet)
11	8	4	19	Rate of climb/descent (ft/min)
11	9	4	19	Altitude change (feet)
11	10	---	---	Set to -1 if maneuver present
12	1	---	---	Line number
12	2	---	---	Form number (=4)
12	3	---	---	Question number (=19)
12	4	---	---	Set to encounter number if three types of maneuver taken
12	5	4	19	Type of maneuver taken (see below for code)
12	6	4	19	Bank angle of maneuver (degrees)
12	7	4	19	Horizontal course change (feet)
12	8	4	19	Rate of climb/descent (ft/min)
12	9	4	19	Altitude change (feet)
12	10	---	---	Set to -1 if maneuver present
13	1	---	---	Line number
13	2	---	---	Form number (=4)
13	3	---	---	Question number (=21)
13	4	---	---	Encounter number
13	5	4	21	First resolution advisory uplinked, (see below for code)
13	6	4	21	set to -1 if at least one advisory is uplinked
13	7	4	21	Second resolution advisory uplinked, (see below for code)
13	8	4	21	set to -1 if at least two advisories are uplinked
13	9	4	21	Third resolution advisory uplinked, (see below for code)
13	10	4	21	set to -1 if at least three advisories are uplinked
14	1	---	---	Line number
14	2	---	---	Form number (=4)
14	3	---	---	Question number (=21)
14	4	---	---	Set to encounter number if more than three advisories are uplinked

DESIGNATION OF DATABASE ENTRIES FOR ENCOUNTER RECORDS (cont.)

LINE	ENTRY	FORM	ITEM	COMMENTS
14	5	4	21	Fourth resolution advisory uplinked, (see below for code)
14	6	4	21	set to -1 if at least four advisories are uplinked
14	7	4	21	Fifth resolution advisory uplinked, (see below for code)
14	8	4	21	set to -1 if at least five advisories are uplinked
14	9	4	21	Sixth resolution advisory uplinked, (see below for code)
14	10	4	21	set to -1 if six advisories are uplinked
15	1	---	---	Line number
15	2	---	---	Form number (=5)
15	3	---	---	Subject pilot identification number
15	4	5	1	
15	5	5	2	
15	6	5	3	(1-6)
15	7	5	4	(1-12)
15	8	5	5	0=No, 1=Yes
15	9	5	6	0=Too early, 1>About right, 2=Too late, 3=Not applicable
15	10	5	7	0=No, 1=Yes
16	1	---	---	Line number
16	2	---	---	Form number (=5)
16	3	5	8	0=No, 1=Still climbing to altitude, 2=To acquire traffic visually
16	4	5	9	0=Resolution Advisory, 1=Display, 2=Both, 3=None, 4=Not applicable
16	5	5	10	1=No good, 2=OK, 3=Not applicable
16	6	5	11	1=Faster, 2=Slower, 3=Same speed
16	7	5	12	1=Equipped, 2=Unequipped
16	8	5	13	0=Below, 1=Same, 2=Above
16	9	5	14	0-9 ratings scale
16	1	5	15	0=ATARS, 1=ATC, 2=Both
17	1	---	---	Line number
17	2	---	---	Actual closest point of approach (CPA) in feet
17	3	---	---	predicted CPA (in feet)
17	4	---	---	Vertical component of actual CPA (in feet)
18	1	---	---	Flag for end of encounter record (=44444)

DESIGNATION OF DATABASE ENTRIES FOR PILOT RECORDS.

LINE	ENTRY	FORM	ITEM	COMMENTS
1	1	---	---	Flag for start of Pilot Record (=77777)
2	1	---	---	Line number
2	2	6	---	Subject Pilot identification number
2	3	6	B	Age (years)
2	4	6	B	1=Married, 2=Separated, 3=Divorced 4=Widowed, 5=Single/Never Married
2	5	6	B	Number of Children (9 for 9 or more)
2	6	6	B	0=Computer Science, 1=Professional(MD, LLB, DDS, etc.), 2=Other self-employed, 3=Management or administration, 4=Engineering or technical, 5=Mechanical (A/C, auto, etc.), 6=Sales, 7=Clerical, 8=Public service, not in previous list, 9=Unemployed or retired
2	7	6	B	1=Aerospace Engineer, 2=Aviation Operations Specialist, 3=Flight Simulation Specialist, 4=Computer Programmer, 5=Section Chief, 6=Air Traffic Control Specialist, 7=Operations Research Analyst, 8=Project Manager, 9=Division Chief
2	8	6	B	Number of years (0 if < 1 year)
2	9	6	B	1=Graduated high school, 2=Some college, 3=Graduated from 2 year college, 4=Graduated from 4 year college, 5=Some graduate school, 6=Advanced degree (M.S., M.A., Ph.D.), 7=Trade/Vocational trainings
2	10	6	C	Years ago
2	11	6	C	Months ago
2	12	6	C	Months ago
2	13	6	C	Class
2	14	6	C	Years ago (0 if < 1 year or never, 9 if 9 years or more)
2	15	6	C	Years ago (0 if < 1 year or never, 9 if 9 years or more)
2	16	6	D1	1=Yes, 2=No
2	17	6	D1	1=Yes, 2=No
2	18	6	D1	1=Yes, 2=No
2	19	6	D1	1=Yes, 2=No
2	20	6	D1	1=Yes, 2=No
2	21	6	D1	1=Yes, 2=No
2	22	6	D2	1=Yes, 2=No
2	23	6	D2	1=Yes, 2=No
2	24	6	D2	1=Yes, 2=No
2	25	6	D2	1=Yes, 2=No
2	26	---	---	Not used (set =0)
3	1	---	---	Line number
3	2	6	D2	1=Yes, 2=No
3	3	6	E	Nearest 10 hours

DESIGNATION OF DATABASE ENTRIES FOR PILOT RECORDS (cont.)

LINE	ENTRY	FORM	ITEM	COMMENTS
3	4	6	E	Nearest 10 hours (99 if > 1000)
3	5	6	E	Nearest 100 hours
3	6	6	F1	Hours
3	7	6	F1	Hours (99 if > 100)
3	8	6	F1	Hours (99 if > 100)
3	9	6	F1	Nearest 10 hours
3	10	6	F2	Nearest 100 hours
3	11	6	F2	Hours
3	12	6	F2	Nearest 100 hours
3	13	6	F2	Hours
3	14	6	F2	Nearest 10 hours
3	15	6	F2	Hours
3	16	6	F2	Not used (set =0)
3	17	6	F3	Nearest 100 hours
3	18	6	F3	Nearest 10 hours (99 if > 1000)
3	19	6	G	Number of simulator types
3	20	6	G	Total number of simulator hours
3	21	6	G	Number of experimental aircraft and advanced avionics
3	22	6	G	Total number of hours of above
3	23	6	H	Number of memberships in clubs, etc.
3	24	6	H	Number of aviation awards
3	25	6	I	Number of incidents
3	26	6	I	Number of accidents
4	1	---	---	Line number
4	2	7	1	Response (1-4), first exam administration
4	3	7	2	Response (1-4), first exam administration
4	4	7	3	Response (1-4), first exam administration
4	5	7	4	Response (1-4), first exam administration
4	6	7	5	Response (1-4), first exam administration
4	7	7	6	Response (1-4), first exam administration
4	8	7	7	Response (1-4), first exam administration
4	9	7	8	Response (1-4), first exam administration
4	10	7	9	Response (1-4), first exam administration
4	11	7	10	Response (1-4), first exam administration
4	12	7	11	Response (1-4), first exam administration
4	13	7	12	Response (1-4), first exam administration
4	14	7	13	Response (1-4), first exam administration
4	15	7	14	Response (1-4), first exam administration
4	16	7	15	Response (1-4), first exam administration
4	17	7	16	Response (1-4), first exam administration
4	18	7	17	Response (1-4), first exam administration
4	19	7	18	Response (1-4), first exam administration
4	20	7	19	Response (1-4), first exam administration
4	21	7	20	Response (1-4), first exam administration
4	22	---	---	Not used (set =0)
4	23	---	---	Version of the exam pilot took first (1-3)
4	24	---	---	Not used (set =0)
4	25	---	---	Pilot's total score (Out of 20 questions)
4	26	---	---	Not used (set =0)

DESIGNATION OF DATABASE ENTRIES FOR PILOT RECORDS (cont.)

LINE	ENTRY	FORM	ITEM	COMMENTS
5	1	---	---	Line number
5	2	7	1	Response (1-4), second exam administration
5	3	7	2	Response (1-4), second exam administration
5	4	7	3	Response (1-4), second exam administration
5	5	7	4	Response (1-4), second exam administration
5	6	7	5	Response (1-4), second exam administration
5	7	7	6	Response (1-4), second exam administration
5	8	7	7	Response (1-4), second exam administration
5	9	7	8	Response (1-4), second exam administration
5	10	7	9	Response (1-4), second exam administration
5	11	7	10	Response (1-4), second exam administration
5	12	7	11	Response (1-4), second exam administration
5	13	7	12	Response (1-4), second exam administration
5	14	7	13	Response (1-4), second exam administration
5	15	7	14	Response (1-4), second exam administration
5	16	7	15	Response (1-4), second exam administration
5	17	7	16	Response (1-4), second exam administration
5	18	7	17	Response (1-4), second exam administration
5	19	7	18	Response (1-4), second exam administration
5	20	7	19	Response (1-4), second exam administration
5	21	7	20	Response (1-4), second exam administration
5	22	---	---	Not used (set =0)
5	23	---	---	Version of the exam pilot took second (1-3)
5	24	---	---	Not used (set =0)
5	25	---	---	Pilot's total score (Out of 20 questions)
5	26	---	---	Not used (set =0)
6	1	---	---	Flag for end of pilot record (=88888)

CODING DEFINITIONS FOR TEXT RESPONSES FROM FLIGHT DEBRIEFING

Question 27 from the flight debriefing form asks for suggestions of mods or improvements to the display. These text comments were subsequently classified and coded to facilitate entry into a numerical database. The coding definitions used follow:

01	REMOVE THE TIC MARKS
02	REDUCE THE INTRUDER SYMBOL TO THE BASIC "+"
03	SOMETIMES THERE IS TOO MUCH CLUTTER
04	MOVE THE SCREEN CLOSER TO THE PILOT
05	ENLARGE THE SCREEN
06	MAKE THE SCREEN SUNLIGHT READABLE
07	THE THREAT SHOULD BE RED
08	THERE SHOULD BE AN AUDIO SIGNAL TO ALERT THE PILOT OF A PROX
09	THE "X" AT THE END OF THE POINT OF CLOSEST APPROACH
	SHOULD BE A DIFFERENT SYMBOL
10	I RECIEVED A LATE ADVISORY THIS FLIGHT
11	THERE IS TOO MUCH INFORMATION IN TOO SMALL OF AN AREA
12	THE "+" "-" TO DENOTE VERTICAL DIRECTION WAS GOOD
13	THE ADVISORY AREA SHOULD BE INCREASED
14	THERE WAS A LOT OF OVERLAPPING
15	THE OUT-OF-RANGE SYMBOL NEEDS TO BE USED MORE OFTEN
16	A TIME FILTER ON TAIL CHASES WOULD HELP ALOT
17	I RECIEVED A BAD COMMAND THIS FLIGHT
18	I WOULD LIKE TO SEE ATARS OPERATE IN A BUSY AREA
19	THERE SHOULD BE A COUNT DOWN TO TIME OF CLOSEST APPROACH
20	THE THREAT SHOULD BE FLASHING
21	NO COMMENTS

CODING DEFINITIONS FOR MANEUVERS AND RESOLUTION ADVISORIES

The encounter records contain the observer's record of the maneuvers that were taken by the subject pilot (form 4, item 19), and of the resolution advisories that were issued to the subject aircraft (form 4, item 21).

The surveillance records also contain a record of the resolution advisories that were issued to the subject aircraft, but they use a different coding system from that of the encounter records. The surveillance records divide the information into two categories: one with the positive and negative advisories coded, and the other with vertical speed limit (VSL) advisories coded.

MANEUVER/ADVISORY	ENCOUNTER REC.	SURVEILLANCE REC.	
		RESOLUTION	VSL
A. TURN RIGHT	1	128	---
B. TURN LEFT	2	64	---
C. CLIMB	3	32	---
D. DESCEND	4	16	---
E. DO NOT TURN RIGHT	5	8	---
F. DO NOT TURN LEFT	6	4	---
G. DO NOT CLIMB	7	2	---
H. DO NOT DESCEND	8	1	---
I. LIMIT CLIMB TO 500 FPM	9	---	1
J. LIMIT CLIMB TO 1000 FPM	10	---	2
K. LIMIT CLIMB TO 2000 FPM	11	---	3
L. LIMIT DESCENT TO 500 FPM	12	---	4
M. LIMIT DESCENT TO 1000 FPM	13	---	5
N. LIMIT DESCENT TO 2000 FPM	14	---	6

