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**USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK**  
**Volume 127**  
**F-15A In-Flight Crew Noise**

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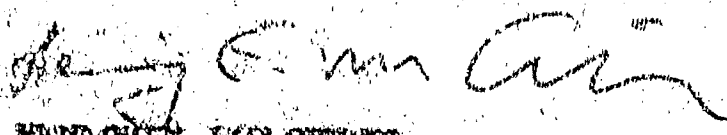
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This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER



HEINRICH E. VON GIERKE

Director

Physiology and Biomechanics Division  
Aerospace Medical Research Laboratory

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| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>The F-15A is a USAF air superiority fighter. This report provides measured data defining the bioacoustic environments at the pilot's location inside this aircraft for 30 flight conditions. Data are reported for one location in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for |                                                                                     |                                               |

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total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application," AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing definitions of quantities, symbols, equations, applications limitations, etc.

## PREFACE

This report was prepared by the Biodynamic Environment Branch, Aerospace Medical Research Laboratory, under Project/Task 723103, Crew Safety In Operational Noise Environments.

The author acknowledges the efforts of Mr. John N. Cole who established the data analysis requirements, Mr. Henry Mohlman and Mr. Fred Lampley of the University of Dayton who assisted in the mechanics of data processing and Mrs. Peggy Massie who typed this report and prepared it for publication.

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## INTRODUCTION

The USAF F-15A is an air superiority fighter type aircraft manufactured by the McDonnell-Douglas Corporation St. Louis, Mo. Power is provided by two F-100-PN-100 (1) turbofan engines, manufactured by the United Aircraft Corporation, Pratt & Whitney Aircraft Division.

This volume provides measured data defining the bioacoustic environments produced inside the aircraft. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the F-15A.

This volume is one of a series published by the Aerospace Medical Research Laboratory (AMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during *ground operations* of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. *Refer to Volume 1* (reference 1) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., in-flight flight crew and passenger noise, near-field/ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published, and is available upon request from AMRL/BEE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of the updated index as it is generated.

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1. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application*, AMRL-TR-75-50 (1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.

## IN-FLIGHT NOISE

### MEASUREMENTS

All noise measurements were made on-board a F-15A aircraft during typical speed, altitude, and flight maneuver conditions. These levels describe the standard F-15A environments but may not be representative of those levels encountered if the aircraft has been configured differently (e.g., major equipment or structural changes).

Acoustic measurements were made inside the cockpit at the pilot's location. Table 1 lists the measurement location and test conditions as numeric/alphabetic designators which are used on the data pages. The designator 1/A means measurement location 1 and test condition A, etc.

The microphone was attached to the pilot's helmet by means of a lightweight boom. This arrangement enabled adjustment of the microphone close to the ear level at a distance of 0.1 meter with its diaphragm parallel and facing away from the helmet's surface. In the analysis, microphone corrections for random incidence were applied to the overall systems response. The recorded samples were analyzed using a four or eight second integration time to obtain a power-averaged level which effectively smooths out short duration fluctuations and best describes the exposure.

### RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced inside the F-15A aircraft at the specified location. This table includes the overall,  $\frac{1}{3}$  octave band, and octave band levels. From these data, C-weighted and A-weighted sound levels, maximum permissible time for one exposure per day (AFR 161-35) with and without standard Air Force ear protectors, preferred speech interference level, and perceived noise level are calculated and presented in Table 3. These measures are widely used to assess the effects of noise on personnel and their performance.



**TABLE 1**  
**MEASUREMENT LOCATIONS AND TEST CONDITIONS**

**F-15A, Nellis AFB, 30 Jan 1979**

| LOCATION<br>1                | POSITION<br>Pilot, Left Side                                | HEIGHT ABOVE DECK<br>Seated Head Level |
|------------------------------|-------------------------------------------------------------|----------------------------------------|
| <b>CONDITION DESCRIPTION</b> |                                                             |                                        |
| A                            | Ground Runup - both engines idle, canopy closed, ECS Off    |                                        |
| B                            | Ground Runup - both engines idle, canopy closed, ECS On     |                                        |
| C                            | Ground Runup - both engines idle, canopy open               |                                        |
| D                            | Ground Runup - both engines 80% RPM, canopy closed, ECS Off |                                        |
| E                            | Ground Runup - both engines 80% RPM, canopy closed, ECS On  |                                        |
| F                            | Ground Runup - both engines 80% RPM, canopy open            |                                        |
| G                            | Takeoff Climb to 10000' - Both Engines A/B                  |                                        |
| H                            | Descent - 10000' → 5000'                                    |                                        |
| I                            | High Speed Run - 6000' AGL - 700 KIAS, 1.2 M                |                                        |
| J                            | Climb - 6000' → 15000' PA - 0.92 M                          |                                        |
| K                            | Climb - 15000' → 20000' PA - 0.88 M                         |                                        |
| L                            | Climb - 20000' → 25000' PA - 0.85 M                         |                                        |
| M                            | Cruise - 25000' PA - 90% RPM - 0.95 M                       |                                        |
| N                            | Cruise - 25000' PA - 1.0 M                                  |                                        |
| O                            | Cruise - 25000' PA - 340 KIAS, 1.2 M                        |                                        |
| P                            | Cruise - 25000' PA - 380 KIAS, 1.35 M                       |                                        |
| Q                            | Climb - 25000' → 40000' PA - Mil Power                      |                                        |
| R                            | Cruise - 40000' PA - 0.95 M                                 |                                        |
| S                            | Cruise - 40000' PA - 1.2 M                                  |                                        |
| T                            | Cruise - 40000' PA - 460 KIAS 1.4 M                         |                                        |
| U                            | Cruise - 40000' PA - 0.92 M                                 |                                        |
| V                            | Descent - 40000' → 19000' PA - speed brakes out             |                                        |
| W                            | Descent - 19000' PA → 320 KIAS                              |                                        |
| X                            | Descent - 15000' PA - 350 KIAS                              |                                        |
| Y                            | Descent - 10000' PA - 380 KIAS                              |                                        |
| Z                            | Descent - 8000' PA - 350 KIAS                               |                                        |
| AA                           | Air Combat Maneuver (ACM)                                   |                                        |
| BB                           | Initial - 1500'                                             |                                        |
| CC                           | 360° Pattern - base to final turn, flaps and gears down     |                                        |
| DD                           | Landing Roll                                                |                                        |

During all flight conditions the EC System was ON except where noted.

| TABLE: MEASURED SOUND PRESSURE LEVEL (DB) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1/3 OCTAVE BAND                           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 2                                         |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| NOISE SOURCE/SUBJECT: ( OPERATION: )      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| F-15A AIRCRAFT                            |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| IN-FLIGHT CREW NOISE                      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| IDENTIFICATION: )                         |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| OMEGA 3.2                                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| TEST 76-084-001                           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| RUN 01                                    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 31 MAY 79                                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| PAGE F1                                   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| LOCATION/CONDITION                        |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| FREQ (HZ)                                 | 1/A | 1/B | 1/C | 1/D | 1/E | 1/F | 1/G | 1/H | 1/I | 1/J | 1/K | 1/L | 1/M | 1/N | 1/O |
| 25                                        | 64  | 71  | 86  | 73  | 75  | 76  | 90  | 75  | 80  | 77  | 75  | 74  | 74  | 73  | 74  |
| 31.5                                      | 62  | 74  | 88  | 74  | 76  | 75  | 91  | 77  | 80  | 80  | 75  | 76  | 75  | 76  | 75  |
| 40                                        | 62  | 80  | 82  | 77  | 81  | 81  | 99  | 83  | 88  | 80  | 80  | 81  | 80  | 81  | 81  |
| 50                                        | 62  | 78  | 77  | 83  | 81  | 81  | 96  | 80  | 87  | 78  | 76  | 75  | 76  | 77  | 78  |
| 63                                        | 70  | 81  | 80  | 92  | 87  | 86  | 102 | 87  | 93  | 86  | 82  | 81  | 82  | 85  | 83  |
| 80                                        | 67  | 81  | 85  | 91  | 93  | 94  | 101 | 86  | 91  | 82  | 79  | 78  | 80  | 81  | 81  |
| 100                                       | 69  | 83  | 83  | 99  | 100 | 103 | 105 | 88  | 93  | 85  | 82  | 81  | 83  | 83  | 83  |
| 125                                       | 68  | 82  | 85  | 90  | 91  | 90  | 100 | 92  | 94  | 50  | 84  | 82  | 84  | 85  | 85  |
| 160                                       | 71  | 82  | 86  | 92  | 91  | 91  | 100 | 97  | 99  | 87  | 85  | 85  | 84  | 87  | 87  |
| 200                                       | 75  | 83  | 86  | 95  | 93  | 91  | 101 | 100 | 108 | 95  | 91  | 91  | 90  | 92  | 93  |
| 250                                       | 73  | 86  | 86  | 94  | 94  | 93  | 100 | 99  | 104 | 97  | 93  | 90  | 92  | 93  | 94  |
| 315                                       | 79  | 90  | 88  | 93  | 96  | 95  | 103 | 103 | 103 | 99  | 97  | 92  | 93  | 95  | 96  |
| 400                                       | 71  | 88  | 90  | 89  | 93  | 94  | 100 | 101 | 103 | 98  | 95  | 93  | 94  | 96  | 97  |
| 500                                       | 70  | 90  | 91  | 88  | 92  | 93  | 99  | 101 | 104 | 99  | 96  | 94  | 96  | 100 | 101 |
| 630                                       | 70  | 84  | 88  | 87  | 89  | 91  | 97  | 100 | 104 | 99  | 95  | 93  | 95  | 99  | 101 |
| 800                                       | 74  | 80  | 86  | 83  | 85  | 86  | 93  | 99  | 104 | 98  | 94  | 92  | 96  | 99  | 101 |
| 1000                                      | 70  | 78  | 86  | 78  | 81  | 83  | 88  | 95  | 102 | 94  | 91  | 90  | 93  | 97  | 99  |
| 1250                                      | 63  | 77  | 86  | 74  | 79  | 80  | 85  | 94  | 100 | 92  | 88  | 87  | 90  | 94  | 95  |
| 1600                                      | 65  | 77  | 85  | 73  | 78  | 82  | 86  | 94  | 101 | 91  | 89  | 88  | 91  | 95  | 96  |
| 2000                                      | 74  | 77  | 98  | 76  | 79  | 81  | 83  | 91  | 98  | 89  | 87  | 87  | 92  | 94  | 94  |
| 2500                                      | 69  | 76  | 90  | 75  | 78  | 81  | 84  | 98  | 101 | 96  | 92  | 91  | 94  | 96  | 100 |
| 3150                                      | 73  | 77  | 96  | 75  | 79  | 81  | 84  | 97  | 98  | 91  | 89  | 89  | 91  | 93  | 94  |
| 4000                                      | 65  | 77  | 91  | 71  | 81  | 82  | 86  | 89  | 95  | 87  | 88  | 89  | 89  | 91  | 92  |
| 5000                                      | 56  | 79  | 90  | 69  | 82  | 82  | 87  | 92  | 97  | 90  | 90  | 90  | 92  | 93  | 94  |
| 6300                                      | 62  | 72  | 87  | 65  | 77  | 77  | 82  | 87  | 91  | 89  | 89  | 90  | 90  | 91  | 91  |
| 8000                                      | 61  | 75  | 82  | 64  | 79  | 78  | 82  | 85  | 89  | 90  | 91  | 94  | 95  | 93  | 93  |
| 10000                                     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| OVERALL                                   | 85  | 97  | 104 | 104 | 104 | 106 | 112 | 110 | 114 | 108 | 105 | 103 | 105 | 108 | 109 |

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.



| TABLE: MEASURED SOUND PRESSURE LEVEL (DB) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| OCTAVE BAND                               |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 2                                         |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| NOISE SOURCE/SUBJECT: ( OPERATION: )      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| F-15A AIRCRAFT                            |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| IN-FLIGHT CREW NOISE                      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| IDENTIFICATION: )                         |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| OMEGA 3.2                                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| TEST 78-004-001                           |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| RUN 01                                    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 31 MAY 79                                 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| PAGE J1                                   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| LOCATION/CONDITION                        |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| FREQ (HZ)                                 | 1/A | 1/B | 1/C | 1/D | 1/E | 1/F | 1/G | 1/H | 1/I | 1/J | 1/K | 1/L | 1/M | 1/N | 1/O |
| 31.5                                      | 67  | 81  | 90  | 79  | 83  | 83  | 100 | 85  | 89  | 84  | 82  | 83  | 82  | 82  | 82  |
| 63                                        | 72  | 85  | 86  | 95  | 94  | 95  | 105 | 90  | 95  | 88  | 84  | 84  | 85  | 87  | 86  |
| 125                                       | 74  | 87  | 89  | 100 | 101 | 103 | 107 | 98  | 101 | 91  | 88  | 88  | 88  | 90  | 90  |
| 250                                       | 81  | 92  | 92  | 99  | 99  | 98  | 106 | 106 | 110 | 102 | 99  | 96  | 96  | 98  | 99  |
| 500                                       | 75  | 92  | 95  | 93  | 96  | 97  | 103 | 105 | 108 | 103 | 100 | 98  | 100 | 103 | 104 |
| 1000                                      | 76  | 83  | 91  | 85  | 87  | 88  | 95  | 101 | 107 | 100 | 96  | 95  | 98  | 102 | 104 |
| 2000                                      | 76  | 81  | 99  | 79  | 83  | 86  | 89  | 110 | 105 | 98  | 95  | 94  | 97  | 100 | 102 |
| 4000                                      | 74  | 82  | 98  | 77  | 86  | 87  | 91  | 98  | 102 | 94  | 94  | 94  | 96  | 97  | 98  |
| 8000                                      | 65  | 77  | 88  | 68  | 81  | 81  | 85  | 89  | 93  | 92  | 93  | 95  | 96  | 95  | 95  |
| OVERALL                                   | 85  | 97  | 104 | 104 | 104 | 106 | 112 | 110 | 114 | 108 | 105 | 103 | 105 | 100 | 109 |

| MEASURED SOUND PRESSURE LEVEL (DB)   |     |     |     |     |     |     |     |     |     |     |     |      |      |
|--------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| OCTAVE BAND                          |     |     |     |     |     |     |     |     |     |     |     |      |      |
| NOISE SOURCE/SUBJECT: ( OPERATION: ) |     |     |     |     |     |     |     |     |     |     |     |      |      |
| F-15A AIRCRAFT                       |     |     |     |     |     |     |     |     |     |     |     |      |      |
| IN-FLIGHT CREW NOISE                 |     |     |     |     |     |     |     |     |     |     |     |      |      |
| LOCATION/CONDITION                   |     |     |     |     |     |     |     |     |     |     |     |      |      |
| FREQ (HZ)                            | 1/P | 1/Q | 1/R | 1/S | 1/T | 1/U | 1/V | 1/W | 1/X | 1/Y | 1/Z | 1/AA | 1/BB |
| 31.5                                 | 85  | 96  | 91  | 89  | 94  | 96  | 93  | 84  | 86  | 85  | 83  | 91   | 81   |
| 63                                   | 88  | 92  | 87  | 85  | 90  | 90  | 91  | 87  | 89  | 90  | 88  | 94   | 87   |
| 125                                  | 98  | 93  | 89  | 88  | 92  | 91  | 91  | 91  | 92  | 92  | 93  | 94   | 93   |
| 250                                  | 105 | 98  | 94  | 94  | 97  | 96  | 96  | 100 | 100 | 101 | 100 | 101  | 97   |
| 500                                  | 109 | 102 | 100 | 97  | 101 | 98  | 98  | 103 | 105 | 101 | 110 | 102  | 102  |
| 1000                                 | 105 | 96  | 96  | 96  | 99  | 96  | 95  | 97  | 97  | 95  | 94  | 93   | 94   |
| 2000                                 | 104 | 96  | 93  | 96  | 100 | 94  | 98  | 102 | 98  | 100 | 94  | 93   | 96   |
| 4000                                 | 99  | 95  | 92  | 95  | 97  | 94  | 96  | 94  | 92  | 92  | 99  | 91   | 90   |
| 8000                                 | 94  | 107 | 102 | 102 | 106 | 107 | 102 | 93  | 90  | 87  | 83  | 89   | 81   |
| OVERALL                              | 113 | 110 | 106 | 106 | 109 | 109 | 107 | 107 | 107 | 107 | 105 | 106  | 105  |

IDENTIFICATION:

OMEGA 3.2

TEST 78-004-001

RUN 02

31 MAY 79

PAGE J2

| MEASURES OF HUMAN NOISE EXPOSURE                                                       |     |     |     |     |     |     |     |     |     |     |     |     |     | IDENTIFICATION: |     |
|----------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------|-----|
| 3                                                                                      |     |     |     |     |     |     |     |     |     |     |     |     |     | OMEGA 3.2       |     |
|                                                                                        |     |     |     |     |     |     |     |     |     |     |     |     |     | TEST 78-004-001 |     |
|                                                                                        |     |     |     |     |     |     |     |     |     |     |     |     |     | RUN 01          |     |
| NOISE SOURCE/SUBJECT: ( OPERATIONS:                                                    |     |     |     |     |     |     |     |     |     |     |     |     |     | 31 MAY 79       |     |
| F-15A AIRCRAFT                                                                         |     |     |     |     |     |     |     |     |     |     |     |     |     | PAGE H1         |     |
| IN-FLIGHT CREW NOISE                                                                   |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| LOCATION/CONDITION                                                                     |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| 1/A                                                                                    | 1/B | 1/C | 1/D | 1/E | 1/F | 1/G | 1/H | 1/I | 1/J | 1/K | 1/L | 1/M | 1/N | 1/O             |     |
| HAZARD/PROTECTION                                                                      |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR                                    |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR                                    |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| NO PROTECTION                                                                          |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| OASLC                                                                                  | 85  | 97  | 133 | 104 | 104 | 106 | 112 | 110 | 114 | 106 | 105 | 103 | 105 | 108             | 109 |
| OASLA                                                                                  | 82  | 92  | 103 | 94  | 97  | 97  | 104 | 108 | 112 | 106 | 103 | 102 | 104 | 107             | 109 |
| T                                                                                      | 675 | 120 | 18  | 85  | 50  | 50  | 15  | 8   | 3.8 | 11  | 18  | 21  | 15  | 9               | 6   |
| HGU-2A/P HELMET WITH H-154                                                             |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| OASLA*                                                                                 | 72  | 84  | 86  | 90  | 91  | 91  | 98  | 98  | 102 | 95  | 92  | 90  | 91  | 93              | 94  |
| T                                                                                      | 960 | 480 | 339 | 170 | 143 | 143 | 42  | 42  | 21  | 71  | 120 | 170 | 143 | 101             | 85  |
| HGU-2A/P HELMET WITH H-154(A)                                                          |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| OASLA*                                                                                 | 68  | 80  | 81  | 87  | 87  | 88  | 94  | 94  | 98  | 91  | 88  | 85  | 86  | 89              | 90  |
| T                                                                                      | 960 | 960 | 807 | 285 | 285 | 240 | 85  | 85  | 42  | 143 | 240 | 404 | 339 | 202             | 170 |
| HGU-2A/P HELMET WITH CUSTOM LINER                                                      |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| OASLA*                                                                                 | 76  | 89  | 93  | 92  | 94  | 95  | 101 | 103 | 107 | 101 | 97  | 95  | 97  | 101             | 103 |
| T                                                                                      | 960 | 202 | 101 | 120 | 85  | 71  | 25  | 18  | 9   | 25  | 50  | 71  | 50  | 25              | 18  |
| COMMUNICATION                                                                          |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)                                       |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| PSIL                                                                                   | 75  | 86  | 95  | 86  | 89  | 90  | 96  | 102 | 107 | 100 | 97  | 95  | 98  | 102             | 103 |
| ANNOYANCE                                                                              |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| PERCEIVED NOISE LEVEL; TONE CORRECTED (PNLT IN PNDB)                                   |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| TONE CORRECTION (C IN DB)                                                              |     |     |     |     |     |     |     |     |     |     |     |     |     |                 |     |
| PNLT                                                                                   | 98  | 107 | 121 | 109 | 112 | 113 | 118 | 122 | 126 | 121 | 117 | 116 | 118 | 121             | 124 |
| C                                                                                      | 2   | 1   | 4   | 1   | 1   | 2   | 1   | 1   | 1   | 2   | 1   | 1   | 1   | 1               | 2   |

\* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

|                                                                                        |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
|----------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----------------|--|
| TABLE: MEASURES OF HUMAN NOISE EXPOSURE                                                |     |     |     |     |     |     |     |     |     |     |      |      |      |      | IDENTIFICATION: |  |
| 3                                                                                      |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| NOISE SOURCE/SUBJECT:                                                                  |     |     |     |     |     |     |     |     |     |     |      |      |      |      | OMEGA 3.2       |  |
| ( OPERATION:                                                                           |     |     |     |     |     |     |     |     |     |     |      |      |      |      | TEST 78-804-001 |  |
| ( F-15A AIRCRAFT                                                                       |     |     |     |     |     |     |     |     |     |     |      |      |      |      | RUN 02          |  |
| ( IN-FLIGHT CREW NOISE                                                                 |     |     |     |     |     |     |     |     |     |     |      |      |      |      | 31 MAY 79       |  |
| (                                                                                      |     |     |     |     |     |     |     |     |     |     |      |      |      |      | PAGE H2         |  |
| LOCATION/CONDITION                                                                     |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| 1/P                                                                                    | 1/Q | 1/R | 1/S | 1/T | 1/U | 1/V | 1/W | 1/X | 1/Y | 1/Z | 1/AA | 1/BB | 1/CC | 1/DD |                 |  |
| HAZARD/PROTECTION                                                                      |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR                                    |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR                                    |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| NO PROTECTION                                                                          |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| OASLC                                                                                  | 113 | 108 | 105 | 104 | 107 | 105 | 107 | 107 | 106 | 105 | 106  | 105  | 104  | 100  |                 |  |
| OASLA                                                                                  | 111 | 108 | 104 | 105 | 107 | 105 | 106 | 105 | 105 | 101 | 102  | 102  | 98   | 96   |                 |  |
| T                                                                                      | 4.5 | 8   | 15  | 13  | 9   | 13  | 11  | 13  | 13  | 25  | 21   | 21   | 42   | 60   |                 |  |
| HGU-2A/P HELMET WITH H-154                                                             |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| OASLA*                                                                                 | 99  | 98  | 93  | 92  | 97  | 96  | 93  | 94  | 93  | 92  | 94   | 91   | 90   | 87   |                 |  |
| T                                                                                      | 36  | 42  | 101 | 120 | 50  | 60  | 101 | 85  | 101 | 120 | 85   | 143  | 170  | 285  |                 |  |
| HGU-2A/P HELMET WITH H-154(A)                                                          |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| OASLA*                                                                                 | 95  | 86  | 85  | 84  | 87  | 86  | 85  | 89  | 89  | 88  | 89   | 87   | 85   | 82   |                 |  |
| T                                                                                      | 71  | 240 | 404 | 480 | 285 | 339 | 404 | 202 | 202 | 240 | 202  | 285  | 404  | 679  |                 |  |
| HGU-2A/P HELMET WITH CUSTOM LINER                                                      |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| OASLA*                                                                                 | 176 | 98  | 96  | 96  | 98  | 96  | 96  | 100 | 98  | 97  | 98   | 97   | 95   | 93   |                 |  |
| T                                                                                      | 11  | 42  | 60  | 60  | 42  | 60  | 60  | 30  | 42  | 50  | 42   | 50   | 71   | 101  |                 |  |
| COMMUNICATION                                                                          |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)                                       |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| PSIL                                                                                   | 106 | 98  | 96  | 97  | 100 | 96  | 97  | 100 | 99  | 96  | 96   | 97   | 92   | 90   |                 |  |
| ANNNOYANCE                                                                             |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PN08)                                   |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| TONE CORRECTION (C IN DB)                                                              |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |
| PNLT                                                                                   | 125 | 124 | 120 | 120 | 125 | 123 | 122 | 122 | 119 | 116 | 116  | 118  | 113  | 111  |                 |  |
| C                                                                                      | 1   | 2   | 2   | 2   | 3   | 2   | 3   | 3   | 2   | 3   | 2    | 3    | 1    | 2    |                 |  |
| * BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.                            |     |     |     |     |     |     |     |     |     |     |      |      |      |      |                 |  |

\* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.