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DEPARTMENT OF DEFENSE HANDBOOK

DEFINITIONS OF HUMAN FACTORS TERMS

This handbook is for guidance only. Do not cite this document as a requirement.

AMSC N/A AREA HFAC

FOREWORD

1. This Military Handbook is approved for use by all Departments and Agencies of the Department of Defense.

2. This handbook is for guidance only. This handbook cannot be cited as a requirement. If it is, the contractor does not have to comply.

3. The goals of this handbook are to eliminate definition overlap, duplication, and conflict and to minimize the length of human factors (HFAC) standardization documents; therefore, as HFAC documents have been revised, their definitions were dropped in favor of citing this handbook.

4. While this handbook focuses on definitions of human factors terms, definitions of some non-human factors terms herein have been adopted from MIL-HDBK-505 since they are used very frequently in HFAC documents that, typically, have cited MIL-HDBK-505 or used terms that harmonize with those in MIL-HDBK-505.

5. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

CONTENTS

1. SCOPE

1.1 Scope. This handbook defines terms frequently used in human factors standardization documents by providing common meanings of such terms to ensure that they will be interpreted consistently and in the manner intended.

1.2 Purpose. This handbook is for guidance only. This handbook cannot be cited as a requirement. If it is, the contractor does not have to comply.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed below are not necessarily all of the documents referenced herein, but are the ones needed in order to fully understand the information provided by this handbook.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following standard and handbook form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the latest issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-1474 - Noise Limits

HANDBOOKS

DEPARTMENT OF DEFENSE

MIL-HDBK-743 - Anthropometry of U.S. Military Personnel

MIL-HDBK-46855 - Human Engineering Program Tasks and Procedures

(Unless otherwise indicated, copies of the above standards are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications.

GUIDES

DEPARTMENT OF DEFENSE

Joint Service Specification Guide 2010 (JSSG 2010) - Crew Systems
Joint Technical Architecture, DoD Human Computer Interface (HCI) Style Guide

2.3 Non-Government publications. The following documents form a part of this handbook to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the latest issue of the DoDISS and supplement thereto.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI S1.1	-	Acoustical Terminology
ANSI S1.4	-	Sound Level Meters, Specification for (DoD adopted)
ANSI S1.6	-	Preferred Frequencies, Frequency Levels, and Band Numbers for Acoustical Measurements (DoD adopted)
ANSI S3.5	-	Calculation of the Articulation Index, Methods for (DoD adopted)

(Application for copies should be addressed to the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM SI 10	-	Standard Practice for the Use of the International System of Units (SI): The Modern Metric System (DoD Adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS

IEEE SI 10	-	Standard Practice for the Use of the International System of Units (SI): The Modern Metric System (DoD Adopted)

(Application for copies should be addressed to the IEEE Service Center, P.O. Box 1331, 445 Hoes Lane, Piscataway, NJ 08555-1331)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 226	-	Acoustics - Normal Equal-Loudness Level Contours.

(Application for copies should be addressed to the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.)

COMMISSION INTERNATIONALE DE L'ECLAIRAGE (CIE)

CIE Pub 15.2	-	Colorimetry, 2nd edition

(Application for copies should be addressed to the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other information services.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

NOTE: Each term appears alphabetically, in bold face, followed by one or more italicized annotations that associate the definition to its application(s). The definitions do not necessarily apply to other applications. Annotations are used as follows:

gen *General human engineering applications.*

uci *User/computer interface or interaction.* Applies to terms that have specific meaning when used in the context of user-computer interaction or supporting human engineering application of computers

snv *Sound, noise, vibration.* Applies to materiel design standards for acoustics and vibration that involve maximum limits for exposure to steady-state or impulse noise, voice/audio communication, aural non-detectability, or habitability.

dsi *Display symbol information.* Applies to design criteria and standards for symbolic and alphanumeric information used on electronically and optically generated displays--primarily airborne displays. Does not include qualities that affect legibility, such as resolution, brightness, uniformity, contrast, flicker, noise, minimum line movement, or color, that may appear as *gen* or *uci* definitions.

acq *Acquisition.* Includes (a) human engineering tasking requirements and guidelines, (b) non-human factors acquisition terms frequently used to express programmatic human factors provisions, and (c) equipment terms used to express human engineering programmatic, design, and test provisions.

A term having more than one definition is listed separately for each application-dependent definition. A term used by several or all applications is designated as *gen*. Terms for sub-definitions are underlined and presented in alphabetical order under the major term to which they apply. Acoustical terms not appearing below are defined in accordance with ANSI S1.1. Anthropometric terms are defined by MIL-HDBK-743.

A-duration (pressure wave duration) *snv*. The time required for the pressure to rise to its principal positive peak and return momentarily to ambient pressure (see Figure 1).

A-weighted sound level (dBA) *snv*. Sound pressure level (in decibels) measured using a sound level meter with an A-weighting network. The A-weighted response is maximum at 2500 Hz and drops rapidly as frequency decreases below 1000 Hz and gradually decreases above 4000 Hz, thereby approximating the frequency dependent human response to moderate sound levels. See ANSI S1.4 for definition of A-weighting filter characteristics.

Abort *uci*. A capability that cancels all user entries in a defined transaction sequence.

Accessible *gen*. An item is considered accessible when it can be operated, manipulated, serviced, removed, or replaced by the suitably clothed and equipped user with applicable body dimensions conforming to the anthropometric range and database specified by the procuring activity or if not specified by the procuring activity, with applicable 5th to 95th percentile body dimensions. Applicable body dimensions are those dimensions which are design-critical to the operation, manipulation, removal, or replacement task.

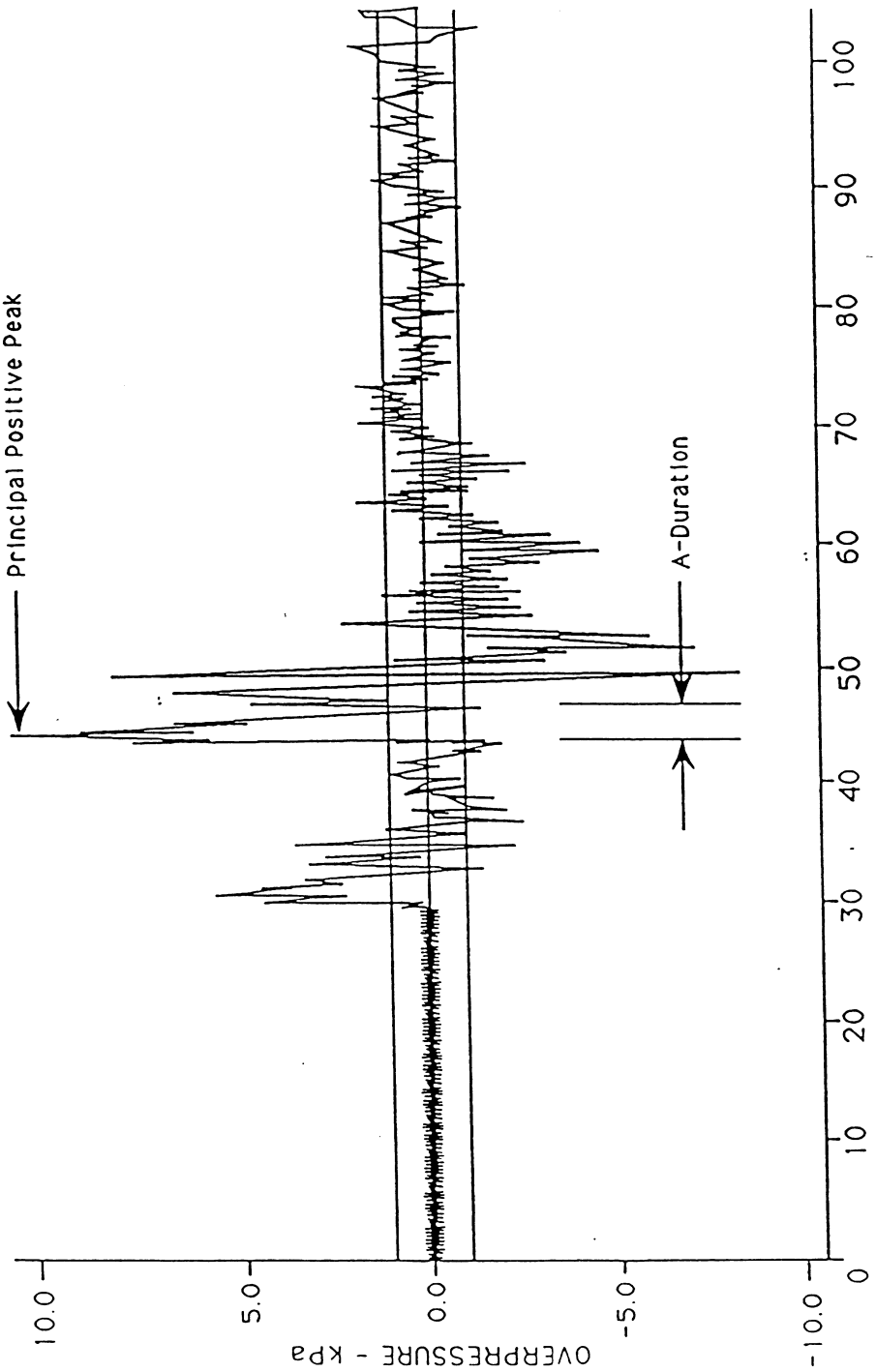

FIGURE 1. Example of A-duration of actual pressure-time history of an impulse noise

***Acq*uisition phases** *acq*:

Phase 0 - Concept exploration. Phase 0 typically consists of competitive, parallel short term concept studies. The focus of these efforts is to define and evaluate the feasibility of alternative concepts and to provide a basis for assessing the relative merits (i.e., advantages and disadvantages, degree of risk) of these concepts a the next milestone decision point. Analysis of alternatives should be used a appropriate to facilitate comparisons of alternative concepts. The most promising system concepts should be defined in terms of initial, broad objectives for cost, schedule, performance, software requirements, opportunities for tradeoffs, overall *acq*uisition strategy, and test and evaluation strategy.

Phase I - Program definition and Risk Reduction. During this phase, the program should become defined as one or more concepts, design approaches, and/or parallel technologies are pursued as warranted. Assessments of the advantages and disadvantages of alternative concepts should be refined Prototyping, demonstrations, and early operational assessments should be considered and included as necessary to reduce risk so that technology, manufacturing and support risks are will in hand before the next decision point. Cost drivers, life cycle cost estimates, cost performance trades, interoperability and acquisition strategy alternatives should be considered to include evolutionary and incremental software development.

Phase II - Engineering and Manufacturing development. The primary objectives of this phase are to: translate the most promising design approach into a stable, interoperable, producible, supportable, and cost effective design; validate the manufacturing or production process; and, demonstrate system capabilities through testing. Low Rate Initial Production (LRIP) occurs while the Engineering and Manufacturing Development phase is still continuing as test results and design fixes or upgrades are incorporated.

Phase III - Production, Fielding/Deployment, and Operational Support. The objectives of this phase are to achieve an operational capability that satisfies mission needs. Deficiencies encountered in Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) should be resolved and fixes verified. The production requirement of this phase does not apply to ACAT IA acquisition programs or software intensive systems with no developmental hardware components. During fielding/deployment and throughout operational support, the potential for modifications to the fielded/deployed systems continues.

Action *uci*. The process of changing the present state of the system (that is, processing data, carrying out a command).

Advisory Signal *gen*. A signal to indicate safe or normal configuration, condition of performance, operation of essential equipment, or to attract attention and impart information for routine action purposes including a signal to indicate a change in system status that , while important, does not require immediate action on the part of the operator.

Aided communication *snv*. Electrically or electronically enhanced, real-time, analog or digital voice communications. In aircraft systems, the communication parts include intra-aircraft, inter-aircraft, and aircraft-to-ground links.

Aircraft pre-flight inspection *gen*. Checking the aircraft prior to each flight for flight preparedness by performing visual examinations and operational tests to discover defects and maladjustments which, if not corrected, could adversely affect safety or mission accomplishment. Also includes a check to determine that the aircraft has been properly serviced for the next flight.

Alpha *gen*/*uci*. A descriptive term used to define a character set containing the letters of an ethnic alphabet, and generally punctuation marks.

Alphanumeric *gen/uci*. A descriptive term used to define a character set containing the letters of an ethnic alphabet, the digits Ø (ZERO) through 9, and generally special symbols and punctuation marks.

Angle of incidence *gen*. The angle between the line of direction of anything (as a ray of light or line of sight) striking a surface and a line perpendicular to that surface drawn to the point of contact. See Figure 2.

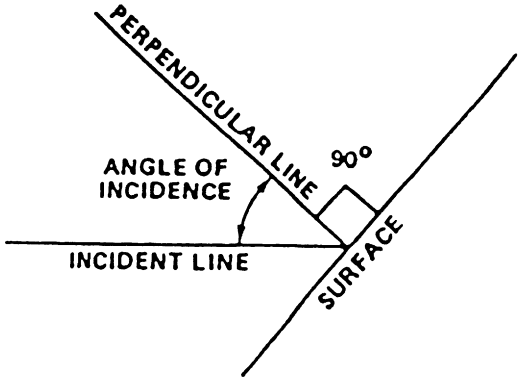

FIGURE 2. Angle of Incidence

Anthropometric dimensions *gen*. Measured dimensions that describe the size and shape of the human body. These dimensions are often presented in the form of summary statistics that describe the range of body dimensions that are observed in a population. Anthropometric terms are defined by MIL-HDBK-743.

Anthropometry *gen*. The scientific measurement and collection of data about human physical characteristics and the application (engineering anthropometry) of these data to the design and evaluation of systems, equipment, and facilities.

Articulation index (AI) *snv*. A predictive estimate of speech intelligibility. The AI is a weighted number between 0 and 1 that maps onto speech intelligibility in a non-linear function from 0% to 100%. It can be used to predict intelligibility using different vocabulary sizes and complexities. The AI is computed from a weighted sum of speech-to-noise ratios in several frequency bands. There are three generally accepted AI methods: 20-band method, the third octave-band method, and the octave-band method. The 20 -band method is considered the most accurate and the octave-band method being the least accurate. See ANSI S3.5. (Also see "Speech intelligibility.")

Assembly *acq*. A number of parts or subassemblies or any combination thereof joined together to perform a specific function and capable of disassembly. (Examples, Power-shovel front fan assembly, audio frequency amplifier.) Note: The distinction between an assembly and a subassembly is determined by the individual application. An assembly in one instance may be a subassembly in another where it forms a portion of an assembly.

Attenuating helmets or headsets *snv*. Hearing protectors that provide the wearer with electronic communications.

Aural nondetectability distance *snv*. The distance at which, for given conditions, the one-third octave-band pressure levels of a noise source at a listener's location are below both the sound level of a quiet environment and average hearing in all one-third octave bands. For a more detailed explanation and examples, see MIL-STD-1474.

Auxiliary system *acq*. A system mechanism or structure other than the airframe, power plant, or armament, e.g., heating and ventilation, pressurization, defrost and defog, inverters, pumps, auxiliary power unit (APU).

Average hearing *snv*. The binaural free-field hearing threshold of normal ears for steady-state noise, given in ISO 226.

B-duration (pressure envelope duration) *snv*. The duration of the primary portion of an impulse noise plus the duration of significant subsequent fluctuations. These durations are considered to be the time interval during which the envelope of pressure fluctuations [positive and negative] is within 20 dB of the peak pressure level. Significant subsequent pressure fluctuations are those whose summed duration is greater than 10% of the duration of the primary portion. The primary portion of an impulse noise is the period of time followed by a level that remains 20 dB below the peak pressure level for a significant duration. For a more detailed explanation and examples, see MIL-STD-1474.

Backup *uci*. A capability that returns a user to the last previous display, field, or character in a defined transaction sequence. Also refers to preserving a second copy of files for data protection purposes.

Band *snv*. A continuous range of frequencies. In communications, the frequency spectrum between two defined limits.

Band level *snv*. The level of the sound or vibration contained within a particular band.

Band-center frequency (f_C) (geometric) *snv*. The mid-band frequency is the geometric mean between the band edge frequencies of a band. The geometric mean is the square root of the product of the band edge frequencies (see "band-edge frequencies, filter"), $f_C = (f_1 \times f_2)^{1/2}$.

Band-edge frequencies, filter *snv*. The upper (f_2) and lower (f_1) frequencies, above and below the frequency of maximum response of a filter, at which the response to a sinusoidal signal is 3 dB below the maximum response.

Bandwidth, filter *snv*. The difference between f_1 and f_2 (see "band-edge frequencies, filter"). This difference may be expressed in Hz, as a percentage of the mid-band frequency, or as the interval between the band-edge frequencies, in terms of octaves or parts thereof, such as one-third or one-fifteenth.

Basic item *acq*. A term used to distinguish an end item of equipment from individual components, assemblies, subassemblies, and parts; e.g., overhaul of the basic item weapon system (AH-64 helicopter air frame including components repaired while on the air frame) versus overhaul of engines, accessories and components, and assemblies which have been removed from the basic item and overhauled to meet established supply requirements for the AH-64 helicopter.

Battle-short switch *acq* A switch used on high-priority equipment designed to bypass or short circuit interlock switches or devices during emergency conditions.

Biomedical *gen*/*acq*. The element including every area that requires provisions for the promotion of health and safety and in particular the protection, sustenance, escape, survival and recovery of personnel employed within the total system environment. This support is provided for operations, maintenance and support personnel under both normal and emergency conditions. It also includes health protection from conditions resulting from system functioning for personnel who are not included in the total system complex, but who will be affected by the system.

Bit (binary digit) *uci*. 1. A character used to represent one of the two digits in the numeration system with a base of two, each digit representing one of two, and only two, possible states of a physical entity or system. 2. In binary notation, either of the characters 0 or 1. 3. A unit of information equal to one binary decision or the designation of one of two possible and equally likely states of anything used to store or convey information.

C-weighted sound level (dBC) *snv*. Sound pressure level (in decibels) measured using a sound level meter with a C-weighting network. It is generally used to limit the low and high frequency response of the instrument so that the instrument will not respond to signals outside the human hearing frequency range at high sound levels. See ANSI S1.4 for definition of C-weighting filters.

Cancel *uci*. A capability that regenerates or re-initializes the current display without processing or retaining any changes made by the user. Cancel usually means omitting only the action of the last command.

Case *acq*. The part of an item of equipment that encloses and protects the equipment from its surroundings and protects the surroundings—including personnel—from the equipment.

Category *uci*. A grouping of data values along a dimension for operational purposes. For example, an air traffic controller might be instructed to implement the same procedures for all aircraft with speeds in the category of 600 to 800 knots. (Also see "Value.")

Caution signal *gen*. A signal which alerts the operator to an impending dangerous condition requiring attention, but not necessarily immediate action. (See "Master caution [warning] signal").

Channel *uci*. A path along which signals can be sent, e.g., data channel, output channel.

Character height *gen*/*uci*. The vertical distance from the top of an un-accented alphanumeric to the bottom of the same alphanumeric.

Chemical warfare a*gen*t *gen*. A chemical agent in a solid, liquid, or gas which produces lethal or damaging effects on humans, animals, plants, or materials, or negatively affects their performance.

Chromaticity coordinates *gen*. A three coordinate system for specifying chromaticity. The chromaticity coordinates can be interpreted as the fraction of the red primary, the fraction of the green primary and the fraction of the blue primary needed in a mixture of the primaries that matches the given color. (See CIE 1931 and CIE 1976 in CIE Pub 15.2.)

Clo unit *gen*. The measurement unit of the insulation value provided by clothing and defined mathematically as: F/(BTU/hr)(ft^2 of body area). One clo unit is that amount of insulation required to keep a nude sedentary man comfortable at 70°F, 50% relative humidity in a normally vented room.

Coding *gen*. Use of a system of symbols, shapes, colors or other variable sensory stimuli to represent specific information.

Coding characteristics *dsi*. Readily identifiable attributes commonly associated with a symbol by means of which such symbols are differentiated; e.g., size, shape, color.

Command *uci*. That part of a computer instruction word that specifies the operation to be performed.

Command and control system *acq* The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.

Command and control system equipment *acq*. The main mission element, equipment and related ground equipment used in collecting, transmitting, processing, storing and displaying information for command and control.

Command entry *uci*. A single command that causes a computer to perform a series of steps.

Command information *dsi*. Displayed information directing a control action.

Command language *uci*. A type of dialogue in which a user composes or selects and activiates control entries.

Common hand tool *acq*. A tool found in common usage or applicable to a variety of operations or to a single operation on a variety of material. Screwdrivers, hammers, and wrenches are examples of common hand tools.

Common part *acq*. A part or component which is generic because (a) equivalent parts are available from more than one manufacturer and (b) it is not designed or intended for exclusive use in or by a single system or piece of equipment.

Common tool *acq*. A tool, routinely found in the tool supply of maintenance organizations for a similar class of system or equipment, which is generic because it is available from more than one manufacturer, and is not designed or intended for exclusive use on or with a single system or piece of equipment.

Components *acq*. Those constituent materials, parts, assemblies, and subassemblies that make up a piece of equipment or a unit. (Also see “Unit.")

Compound number *uci*. A quantity involving different units of measure, for example, 3 feet 4 inches or 10 pounds 5 ounces.

Confirm *acq*. When used relative to test and evaluation, "confirm" implies a qualitative test that requires comparison of test results to an applicable requirement(s) (See "Demonstration").

Connector *acq*. A piece of hardware that joins or attaches lines or cables to other lines or cables or to items of equipment. The term is used rather loosely to refer to either of two parts that mate with each other or to the plug that mates with a receptacle.

Contrast *gen*. See "Luminance contrast."

Control *gen*. A mechanism used to regulate or guide the operation of a machine, equipment component, subsystem, or system.

Control entry *uci*. User input of data for computer processing/sequence control (e.g., function key actuation, menu selection, command entry) whereby the character or symbol and a control key are jointly activated, requiring computer responses to such inputs.

Control mode *uci*. The condition of the keyboard when the control (CTL) is depressed. In this mode the alpha keys, which are also labeled with a control character, generate that associated control character.

Controller *uci*. Any device used to position the cursor on the computer monitor screen. (Examples are: mouse, joystick, cursor keys, light pen, touch screen, track ball.)

Cover *acq*. An item of equipment that closes an access opening.

Critical display *gen*. A display required for mission success.

Critical fusion frequency (CFF) *gen*. The threshold frequency of a flickering light stimulus at which the light is reported to be constantly on (i.e., no flicker is discernible).

Critical task *acq*. A task requiring human performance which, if not accomplished in accordance with system requirements, will most likely have adverse effects on cost, system reliability, efficiency, effectiveness, or safety. Critical performance is usually part of a single line or flow in the-operation or maintenance cycle of the system. An example of a single line of flow involving human performance is the transmission of a message which must be passed for operations or maintenance cycles to commence or to continue, such as an order to prepare a missile for launching. If this order is not passed, or if it is garbled, the entire missile operation cycle may cease to function as required. A task is also considered critical whenever equipment design characteristics demand human performance which approaches the limits of human capabilities (e.g., human performance functions and tasks are too demanding, information presented to personnel is inadequate to meet human performance requirements, appropriate information displayed is not perceived, or controls provided cannot be effectively operated) and thereby significantly contributes to the occurrence of one or more of the following conditions, but not necessarily limited thereto:

a. Jeopardized performance of a mission

b. Degradation of mission effectiveness or completion from inaccurate performance; e.g., human entry or response error predicted required system performance.

c. Degradation of the circular error probability (CEP) to an unacceptable level

d. Delay of a mission beyond acceptable time limits; e.g., human time to react will not meet required system reaction time

e. Improper operation resulting in a system “no-go," inadvertent weapons firing, or failure to achieve operational readiness alert

f. Exceeding predicted times for maintenance personnel and maintenance ground equipment (MGE) to complete maintenance tasks (As a rule, performance times will be considered critical if the total maintenance response time significantly exceeds maintenance analysis estimates, and affects MGE quantitative requirements.)

g. Degradation of system equipment below reliability requirements; i.e., mean time between failures (MTBF) is reduced

h. The damaging of system equipment, resulting either in a return to a maintenance facility for major repair, or in unacceptable costs, spare requirements, or system downtime

i. A serious compromise of weapons system security

j. Injury or illness to personnel

k. Unacceptable degradation of NBC survivability

Critical warning *gen*. A warning that indicates a condition which, if not corrected, will result in mission failure, equipment damage, or personal injury. (See "Warning signal.")

Cursor *uci*. A marker on the display screen that indicates the position where the computer expects the next input or will display the next output. The cursor may be positioned under computer control or by the user. (See "Controller.")

Data *uci*. The raw materials from which a user extracts information. Data may include numbers, words, pictures, etc.

Data entry *uci*. User input of data (numeric, textual, graphic, or analog) for computer processing and computer responses to such inputs.

Data field *uci*. An area of the display screen reserved for user entry of a data item.

Data field label *uci*. An area of the display screen that serves as a prompt for entering a data item. It usually cannot be changed by a user.

Data item *uci*. A sub-unit of descriptive information or value classified under a data element. For example, the data element, “military personnel grade," contains data items such as "sergeant," "captain," and "colonel." Sometimes a data item may contain only a single character. Data items may be entered by a user or may be supplied by the computer.

Data protection *uci*. Functional capabilities that guard against unauthorized data access, data tampering, user errors, and computer failure.

Data transmission *uci*. Message exchange among system users, and also message exchange with other systems. Transmitted data may include numbers, words, pictures, or other representations of data.

Data validation *uci*. Functional capabilities that check data entry items for correct content or format as defined by software.

dBA *snv*. The unit used to express sound level measured through the A-weighting network of a sound level meter. See "A-weighted sound level (dBA)."

dBC *snv*. The unit used to express sound level measured through the C-weighting network of a sound level meter. See "C-weighted sound level (dBC)."

dBP *snv*. The unit used to express peak pressure level as measured with a peak-reading sound level meter or combination of instruments with equivalent characteristics, without weighting networks, and with total rise time not exceeding 1/20 of the measured A-duration.

Dead-man control *gen*. A control which requires a continuous pressure or contact by the operator to maintain machine, equipment component, subsystem, or system operation. Such operation automatically returns to a noncritical state once operator pressure or contact is removed.

Decibel (dB) *snv*. A unit to express sound pressure level. The decibel is the unit of level when the base of the logarithm is the tenth root of ten, and the quantities concerned are proportional to power. The dB has meaning only when the referenced quantity is known. The internationally accepted reference pressure in acoustics is 20 micropascals (µPa) which corresponds to 0 dB. See "Sound pressure level."

Decibel (dB) reference level (0 dB) *snv*. The level that corresponds to an RMS pressure of 20 micropascals (µPa).

Decontamination *gen*. Use of chemical solution or physical processes to absorb, destroy, neutralize, or remove nuclear, chemical, or biological a*gen*ts from persons, objects, or areas.

Dedicated key *uci*. A key which produces one code and is never affected by the position of either the CTL or SHIFT keys.

De-emphasis *snv*. The inverse of pre-emphasis, employed to restore original vowel-consonant amplitude relationships in pre-emphasized speech; primarily useful in maintaining the "natural" sound quality. (See "Pre-emphasis.")

Default value *uci*. A predetermined, frequently-used value for a data field or control entry, intended to reduce required user entry actions.

Delimiter *uci*. A character marking the beginning or end of a unit of data.

Demonstrate *acq*. When used relative to test and evaluation, "demonstrate" implies a qualitative test that does not require comparison of test results to an applicable requirement(s). (See "Confirm.")

Depot level maintenance *acq*. Maintenance performed on material requiring major overhaul or a complete rebuild of parts, assemblies, subassemblies, and end items, including the manufacture of parts, modification, testing, and reclamation as required.

Determine *acq*. When used relative to test and evaluation, implies a quantitative test that does not require comparison of test results to an applicable requirement(s). (See "Evaluate.")

Developmental test and evaluation (DT&E) *acq*. Test and evaluation performed to (1) identify potential operational and technological limitations of the alternative concepts and design options being pursued, (2) support the identification of cost-performance trade-offs, (3) support the identification and description of design risks, (4) substantiate that contract technical performance and manufacturing process requirements have been achieved, and (5) support the decision to certify the system ready for operational test and evaluation.

Dialogue (or dialog) *uci*. A structured series of interchanges between a user and a computer. Dialogues can be computer initiated, e.g., question and answer, or user initiated, e.g., command languages.

Dichotic *snv*. The condition in which the sound stimulus presented at one ear differs from the sound stimulus presented at the other ear. The stimulus may differ in sound pressure, frequency, phase, time, duration, bandwidth, or other characteristics.

Dimension *uci*.. A scale or categorization along which data may vary, taking different values at different times. For example, relevant dimensions for an aircraft might include its heading, speed, and altitude.

Direction designation *uci*. User entry of directional data (azimuth, bearing, heading) on a display.

Display format *uci*/*gen*. The organization of different types or elements of data in a display, including information about the data such as labels, and other user guidance, such as prompts of error messages. This may also refer to the size of the display or the ratio of the display width to height.

Display framing *uci*. User control of display coverage by display movement, including paging, scrolling, offset, and expansion.

Display *gen*eration *uci*. The means of specification of data outputs, either by a user or automatically by the computer.

Display tailoring *uci*. Designing displays to meet the specific task needs of a user, rather than providing a *gen*eral display which can be used for many purposes.

Display update *uci*. Regeneration of changed data to show current status, by user request or automatically by the computer.

Duty *acq*. See "Task analysis."

Effective temperature *gen*. An empirically determined index which combines into a single value the effect of temperature, humidity, and air movement on the sensation of warmth or cold felt by the human body. The numerical value is that of the temperature of still, saturated air which would induce an identical sensation.

Eight-hour time-weighted average sound level (TWA) *snv*. A measurement of the employee's workday noise environment. The TWA is that constant noise level, in dBA, slow response, which may cause hearing loss in 8 hours to the same extent as the exposure to the actual workday noise. The workday noise environment may or may not last for 8-hours, but the TWA is always computed as if the TWA level was present for an 8-hour work shift. Implicit in the TWA is a stipulated exchange rate between sound level and doubling of exposure time.

$$TWA = \frac{Q}{\log_{10} 2} \log_{10} \left\{ \frac{1}{8} \int_0^T 2^{L(t)/Q} \, dt \right\}$$

where: T =total workshift time in hours
t = varying time
L(t) =the time varying A-weighted sound pressure level
Q = exchange rate, normally 3 dB.

The TWA value can be calculated from the following alternate expression when the sound level takes on a sequence of N constant levels, L_i, each lasting for a time period of C_i hours:

$$TWA = 85 + \frac{Q}{\log_{10}2} \log_{10}(D)$$

where: $D = \sum_{i=1}^{N} \frac{C_i}{T_i}$

and: T_i = Limiting exposure time at each A-weighted sound pressure level = $\frac{8}{2^{(L_i-85)/Q}}$

L_i = i^{th} A-weighted sound pressure level.

The exchange rate must be specified when referring to TWA. Note: TWA is identical to L_{eq8} with an exchange rate of 3 dB as utilized by U.S. and international sound and noise standards.

Electroluminescent device (EL) *gen*. A device that produces light through electrical excitation of a phosphor.

Enter *uci*. An explicit user action that effects computer processing of user entries. For example, after typing a series of numbers, a user might press an ENTER key that will add them to a data base, subject to data validation.

Entry *uci*. See "Data entry" or "Control entry."

Environment *gen*. The aggregate of all the conditions and influences including physical location and operating characteristics of surrounding equipment and occupants, including temperature, humidity, and contaminants or surrounding air; operational procedures, acceleration, shock, vibration, and radiation.

Equipment *gen*. General term designating any item or group of items.

Equipment, powered ground (PGE) *acq*. An assembly of mechanical components including an internal combustion engine or motor, gas turbine, or steam turbine engine mounted as a single unit on an integral base or chassis. Equipment may pump gases, liquids, or solids; or produce compressed, cooled, refrigerated or heater air; or generate electricity and oxygen. Examples of this equipment: portable cleaners, filters, hydraulic test stands, pumps and welders, air compressors, air conditioners. Term applies primarily to aeronautical systems.

Equipment failure *gen*. Cessation of the ability to meet the minimum performance requirements of the equipment specifications. Further, equipment failure should imply that the minimum specified performance cannot be restored through permissible readjustment of operator controls.

Equipment grades *snv*. Categories of equipment undergoing measurements of airborne sound measurements of shipboard equipment to classify usage-driven acceptance criteria. Equipment grades are defined below:

Grade A3. Equipment to be installed in spaces where direct speech communication must be understood with minimal error and without repetition over a distance of 2 meters (6-1/2 ft) or less.

Grade A12. Equipment to be installed in spaces where direct speech communication must be understood with minimal error and without repetition over a distance greater than 2 meters (6.5 ft).

Grade B. Equipment to be placed in spaces where comfort of personnel in their quarters is the principal consideration.

Grade C. Equipment to be placed in the sonar room, sickbay, library, or other spaces requiring low sound levels and which are not covered in other categories.

Grade D. Equipment to be placed in spaces where avoidance of hearing loss is the prime consideration and intelligible speech communication is not normally required.

Grade E. Equipment to be placed in high sound level areas where voice communication is accomplished with high vocal effort and where amplified speech and telephones are normally available.

Equivalent A-weighted sound level *snv*. Equivalent A-weighted sound level is the level equivalent to the octave-band levels for the equipment being measured. It is not the weighted sum of the individual octave-band levels, but an equivalent level based on experience with spectral shapes of actual shipboard equipment and shipboard spaces.

Error management *uci*. Interface design to facilitate the detection and correction of user errors.

Evaluate *acq*. When used relative to test and evaluation, "evaluate" implies a quantitative test that requires comparison of test results to an applicable requirement(s). (See "Determine.")

Facilities *acq*. A physical plant, such as real estate and improvements thereto, including building and equipment, which provides the means for assisting or making easier the performance of a system function. The facilities to which this standard apply are those in which personnel perform system operational or maintenance duties.

Fail-safe design *gen*. Design where a failure will not adversely affect the safe operation of the system, equipment or facility.

Feedback *gen*. Product response (e.g., visual, aural, or tactile) which indicates the extent to which the operator's desired effect was accomplished. Feedback can be either intrinsic or extrinsic. Intrinsic feedback (feel) is that which the individual senses directly from the operation of the control devices (e.g., clicks, detents, resistance, response ratios, stops, control displacement). Extrinsic feedback is that which is sensed from an external source that indicates the consequences of the control action (e.g., aural tones, display changes, indicator lights).

Field *uci*. See "Data Field."

Field maintenance *gen/acq*. That maintenance authorized and performed by designated maintenance activities in direct support of using organizations. It is normally limited to replacement of unserviceable parts, subassemblies, or assemblies.

File *uci*. A collection of data that is stored in a computer, treated as a single unit by the operating system of the computer.

Flight member *snv*. Any crew member or passenger on board an aircraft. (There is a distinction between flight crew and passengers, for more information see JSSG - 2010)

Flight mode *snv*. In aircraft systems, each operational activity/maneuver during which noise levels are effectively constant.

Focal point *acq*. An individual designated as a central source of information or guidance on a specific program or project requiring coordinated action by two or more agencies. The designation of a focal point does not relieve any functional area of its basic responsibility.

Format *uci*. See "Display format."

Form filling *uci*. A type of dialog in which the computer displays forms containing labeled fields for data entry by a user.

Framing *uci*. See "Display framing."

Full mission capable (FMC) *acq*. A status code meaning that the system or equipment has all systems working which are needed to perform all of its primary missions.

Function *uci*. A computer-supported capability provided to users as an aid for task performance. Examples of functions are position designation or direction designation.

Function *acq*. See "Task analysis."

Function key *uci*. A key, such as the SHIFT key, which initiates or modifies a machine function, (e.g., effects a control entry, instructs the computer to perform a step, or series of steps) but does not generate or represent a coded character in the Military Standard Code for Information Exchange (MSCII).

Government furnished equipment (GFE) *acq* Equipment furnished by the Government which is designed into or will otherwise become a part (or subsystem) of the total system being *acq*uired.

Hard copy *uci*/*gen* In computer graphics or telecommunications, a permanent reproduction of the data displayed or transmitted. The reproduction may be on any media suitable for direct use by a person. Note 1: Teletypewriter pages, continuous printed tapes, facsimile pages, computer printouts, and radiophoto prints are all examples of hard copy. Note 2: Magnetic tapes or diskettes or nonprinted punched paper tapes are not hard copy.

Head-up display (HUD) *gen*. A display that produces a virtual image of symbolic or pictorial information superimposed on the crewmember's forward field-of-view. For aeronautical systems, the technique results in the combination of flight control and weapon delivery information with external visual cues from the scene normally viewed through the windscreen. Specific symbols and formats can be selectable for a given mode of operation. Take-off, landing, navigation, hover, bob-up, terrain following/avoidance, sling load transportation, air-to-air, and weapon delivery modes may be provided. Video images may also be displayed, such as those from TV, FLIR, or scan converted radar, along with symbology.

Hearing conservation criteria *snv*. Noise exposure limits that, when exceeded, indicate the need for hearing conservation measures.

Hearing damage-risk criteria (DRC) *snv*. Comprehensive statements about the relation between various descriptive parameters of the noise exposure (e.g., sound pressure level, exposure time) and the probability of temporary or permanent hearing loss.

Hearing Protectors *snv*. Devices designed primarily to reduce the noise reaching the auditory system. They may be of any type: earplugs, noise muffs (circumaural), or attenuating helmets or headsets.

Helmet-mounted display (HMD) *gen*. A display that projects video imagery, symbolic and/or alphanumeric information on a display medium (e.g., combining glass or visor) into one or both eyes of the crewmember. In most aeronautical system applications the display medium is attached to a flight helmet which is a part of a head tracking system. The line of sight of the helmet is determined by the head tracking system and a designated sensor is slewed in a one-to-one angular correspondence with this line of sight. The display medium then displays the image from the designated sensor: television (TV), forward looking infrared (FLIR), or scan converted radar. Specific symbols and formats can be selectable for a given mode of operation.

Help *uci*. A capability that displays information upon user request for on-line guidance. HELP may inform a user generally about system capabilities, or may provide more specific guidance in data or information handling transactions.

Highlighting *uci*. Emphasizing displayed data or format features in some way, e.g., through the use of underlining, bolding, or inverse video.

Hooking *uci*. A task performed by a human operator using a display interactive device (e.g., joystick, mouse) to select/designate specific display information (e.g., symbols) for further action or modification.

Horizontal situation display (HSD) *gen*. An HSD is a display which aids the crew members in navigation. Basically, it consists of heading, distance-to-go, bearing-to-destination or some other navigation facility or reference, track, map, course, aircraft position, and steering error. Modes may consist of manual, north-up, track-up, data, test, and off. Selection of map scale factors may also be provided. Navigation update can be accomplished with the proper computer techniques. The HSD also has the capability of combining symbols with the map information. Symbols may be used for annotation of the projected map, such as check points, various legs of the mission, high-risk areas, ground track deviation, and radar homing and threat warning. Specific modes and formats can be selectable for a given mode of operation.

Hover, in ground effect *gen*. A condition when the helicopter is motionless with respect to the ground and the rotor is operating at one rotor diameter height or less above ground level.

Human engineering *gen*. The application of knowledge about human capabilities and limitations to system or equipment design and development to achieve efficient, effective, and safe system performance at minimum cost and manpower, skill, and training demands. Human engineering assures that the system or equipment design, required human tasks, and work environment are compatible with the sensory, perceptual, mental, and physical attributes of the personnel who will operate, maintain, control and support it.

Human engineering design criteria *gen*. Stated limits on design to achieve the objectives of human engineering. (See "Human engineering.")

Human factors *gen*. A body of scientific facts about human characteristics. The term covers all biomedical and psychosocial considerations; it includes, but is not limited to, principles and applications in the areas of human engineering, personnel selection, training, life support, job performance aids, and human performance evaluation.

Human Factors test and evaluation (HFTE) *acq*. Part of the system testing effort conducted in accordance with approved test plans. HFTE includes all testing directed toward validation and evaluation of human factors analyses, studies, criteria, decisions, and operational and maintenance design characteristics, and features. These may include engineering design tests, model tests, mockup evaluations, demonstrations, and subsystem tests conducted to verify system level requirements. Human factors tests are a part of system developmental test and evaluation and operational test and evaluation.

Human performance *gen*. A measure of human functions and action in a specified environment, reflecting the ability of actual users and maintainers to meet the system's performance standards, including reliability and maintainability, under the conditions in which the system will be employed.

Illuminance *gen*. A measure of the amount of light falling on a surface. The metric unit for illuminance is lm/m^2, or lux (light flux). (See "Metric equivalents, abbreviations, and prefixes.")

Impulse noise *snv*. A short burst of acoustic energy consisting of either a single impulse or a series of impulses. The pressure history of a single impulse includes a rapid rise to a peak pressure, followed by a somewhat slower decay of the pressure envelope to ambient pressure, both occurring within 1 second. A series of impulses may last longer than 1 second.

Information *uci*/*gen* Organized data that users need to perform their tasks successfully. Information serves as an answer to a user's questions about data and implies effective assimilation of data by a user. Data that have been processed and formulated by automated or manual means to satisfy a knowledge requirement for use by a decision maker.

Information system *gen*. A system, whether automated or manual, that comprises people, machines, and/or methods, organized to collect, process, transmit, and disseminate data that represent user information.

Information system *uci*. A computer-supported, task-oriented tool designed to help users perform defined information handling tasks.

Input *uci*. (1) The data entered into a computer for processing, (2) the process of entering data or (3) pertaining to the devices that enter data. (See "Control entry" and "Data entry.")

Intermediate level maintenance *acq* Maintenance that is normally the responsibility of, and performed by, designated maintenance activities for direct support of using organizations. Its phases normally consist of calibrating, repairing, or replacing damaged or unserviceable parts, components, or assemblies; modification of material, emergency manufacturing of unavailable parts; and providing technical assistance to using organizations. Intermediate maintenance is normally accomplished by the using commands in fixed or mobile shops.

Interaction *uci*. See "Transaction."

Interface *uci*. A common boundary between automatic data processing systems or parts of a single system, or between equipment(s) and a user. (See "User-system interface.")

I**nterrupt** *uci*. Stopping an ongoing transaction in order to redirect the course of the processing. Examples of interrupt options are ABORT, BACKUP, CANCEL, and RESTART.

Job *acq*. See "Task analysis."

Joystick *uci*/*gen*. A stick type input device used to provide continuous control movement. In computer applications, joysticks are typically used to provide two axis cursor control on a display screen. Joysticks may be displacement- or force-operated. A displacement (or isotonic) joystick moves in the direction it is pushed. Displacement joysticks are usually spring-loaded so that they return to their center position. A force-operated (or isometric) joystick has no perceptible movement; its output is a function of the force applied.

Justification *uci*. Alignment of text or numbers with a margin. Left-justified text is aligned at the left margin; the right margin is left ragged. Right-justified text is aligned at the right margin; the left margin is left ragged. Fully-justified text has spacing added between letters and words so that all lines are the same length, resulting in the alignment of both margins.

Keyboard *uci*. An input device used to enter data by manual depression of keys which causes the generation of the selected code element. That area of the device in which keys associated with characters are arranged

Keyboard arrangement *uci*. The positioning of keys with relation to each other and their association with specific characters.

Keytop *uci*. A finger contact member which allows effective operation of the device, also called a key.

Label *uci*. A title or descriptor that helps a user identify displayed data. (See "data field label.")

Lesson learned *acq*. A proven experience of value in the conduct of future programs. It is normally a conclusion drawn from evaluation of feedback information or from analysis of the performance resulting from technical and management functional activities. A lesson learned is usually recorded and eventually incorporated, where applicable, in regulations, technical manuals, specifications, standards, or handbooks.

Life support *acq*. That area of human factors which applies scientific knowledge to items which require special attention or provisions for health promotion, biomedical aspects of safety, protection, sustenance, escape, survival, and recovery of personnel.

Light-emitting diode (LED) *gen*. A pn-junction semiconductor device that emits incoherent optical radiation when biased in the forward direction. Primarily used in place of incandescent lamps as indicators and in alphanumeric assemblies.

Line replaceable unit (LRU) *acq*. A component, assembly, or subassembly which is normally removed and replaced as a single unit to correct a deficiency or malfunction. LRUs may be composed of shop replaceable units (SRUs) which are generally removed and replaced in a maintenance shop.

Liquid crystal display (LCD) *gen*. A segmented, solid state, passive display device consisting of a liquid crystal material, composed of specialized molecules, sandwiched between two conductive plates, at least one of which is transparent. Transmission of light through the medium containing the crystals is affected by the orientation of the crystals. When a current is applied, the orientation of the crystals, and therefore the transmission characteristics of the medium, are altered, resulting in contrast between particular segments/pixels and their background.

Local tracks *dsi*. Tracks generated by the co-located sensor(s) upon which the air defense system relies to acquire targets, e.g., tracks obtained from the system's own radar. Also known as "ownership tracks".

Logistic Support Analysis (LSA) *acq*. The selective application of scientific and engineering efforts undertaken during the acquisition process, as part of the system engineering and design processes to assist in complying with supportability and other Integrated Logistics Support (ILS) objectives. ILS is a management process to facilitate development and integration of logistics support elements to *acq*uire, field and support a system. These elements include: design, maintenance planning, manpower and personnel, supply support, support equipment, training, packaging and handling, transport, standardization and interoperability.

Lowercase letters *uci*. The "small" letters. Letters that are not capitalized.

Luminance *gen*. The amount of light flux (power) per unit area per solid angle (steradian) emitted or reflected from a surface. The metric unit for luminance is candelas per square meter or lumens per steradian per square meter.

Luminance contrast *gen*. The contrast between a figure and its background equals the difference between the higher luminance (Lmax) and the lower luminance (Lmin) divided by the lower luminance (Lmin), i.e.,

$$C = \frac{Lmax - Lmin}{Lmin}$$

Related contrast formulae are as follows:

Lmax	Lmin	Luminance Contrast	Luminance Contrast (Alt)	Modulation Contrast	Contrast Ratio
		$\frac{Lmax - Lmin}{Lmin}$	$\frac{Lmax - Lmin}{Lmax}$	$\frac{Lmax - Lmin}{Lmax + Lmin}$	$\frac{Lmax}{Lmin}$
100	50	1.0	0.50	0.33	2.0
100	25	3.0	0.75	0.60	4.0
100	10	9.0	0.90	0.82	10.0

For display applications: Lmax is the total luminance of the area with the higher luminance, including any background or reflected light, as measured in the specified lighting conditions; Lmin is the luminance of the area with the lower luminance, as measured under the specified lighting conditions, including any reflected light and any stray display emissions.

Luminance ratio (LR) *gen*. The ratio of the target, subject, or symbol luminance to the surrounding field or background luminance. For projection systems, the luminance ratio is equal to the light output of a projector (measured with no film in the projector) reflected off the screen (image luminance) divided by all the light falling on the screen (measured from the greatest viewing angle) other than that actually forming the image (nonimage or background), i.e., $LR = L / L_n$,

where L = Image or subject luminance and L_n = Nonimage or background luminance.

Macro *uci*. The capability to allow the user to assign a single name or function key to a defined series of commands for use with subsequent command entry. Sometimes called "smart key" or "script." Examples of use are storage of addresses or signature blocks that are frequently used. Usually initiated through use of a function key.

Maintainability, design for *gen*. Design considerations directed toward achieving those combined characteristics of equipment and facilities which will enable the accomplishment of necessary maintenance quickly, safely, accurately, and effectively with minimum requirements for personnel, skills, special tools, and cost.

Maintenance *gen*. All actions necessary for retaining material in (or restoring it to) a serviceable condition. Maintenance includes servicing, repair, modification, modernization, overhaul, inspection, condition determination, corrosion control, and initial provisioning of support items.

Man-machine interface *gen*. The actions, reactions, and interactions between humans and other system components. This also applies to a multistation, multiperson configuration or system. Term also defines the properties of the hardware, software or equipment which constitute conditions for interactions.

Man-man interface *gen*. The actions, reactions, and interactions (i.e., transactions) among persons as they perform jobs, duties, and tasks to operate and maintain a manned system, including peer-peer and subordinate-supervisor interactions.

Management information system (MIS) *uci*/*acq*. An organized assembly of resources and procedures required to collect, process, and distribute data for use in decision making.

Manpower and personnel requirements *acq*. The number of trained personnel required to operate, maintain and support system equipment in its operational environment. Manpower refers to the number of people and personnel refers to their skills. Efficient operation of the system, or piece of equipment, depends in part on the proper mix and skill level of military and civilian personnel. Information *gen*erated by this element serves as a basis for manpower and personnel planning and programming decisions and setting related parameters and constraints on human engineering analysis and design.

Masked threshold *snv*. The sound pressure level, in dB, at which a signal becomes distinguishable from other signals and/or noise.

Master caution (warning) signal *gen*. A signal which indicates that one or more caution (warning) lights have been actuated. (See "Caution signal" and "Warning signal.")

Materiel design standard *gen*.. Design standards that provide requirements to equipment designers and manufacturers.

Menu *uci*. A list of options from which a user makes a selection.

Menu selection *uci*. A type of dialogue in which the user selects one item out of a list of displayed alternatives, whether the selection is by pointing, by entry of an associated option code, or by actuation of an assigned function key.

Message *uci*. Data that are transmitted from one computer user to another as a discrete transaction or data that are displayed to users to aid in performing their tasks. (See "Data transmission" and "User guidance.")

Metric equivalents, abbreviations, and prefixes *gen*. Metric (SI) units, inch-pound units, and multipliers to convert from metric to inch-pound units and the converse are presented in Table I. For more complete listings, see ASTM or IEEE SI 10.

Mission *acq*. See "Task analysis."

Mission area *acq*. A location in an aircraft occupied by flight members during a flight mode. A flight member may occupy more than one mission area during a mission.

TABLE I. Metric conversions, abbreviations, and prefixes

	TO CONVERT FROM	TO	MULTIPLY BY
ANGLE	degree (deg)	radian (rad)	0.017 453 29
	minute (min)	radian (rad)	0.000 290 888
	second (sec)	radian (rad)	0.000 004 848
	radian (rad)	degree (deg)	57.295 8
	radian (rad)	minute (min)	3437.75
	radian (rad)	second (sec)	206264.0
LENGTH-AREA-VOLUME	foot (ft)	meter (m)	*0.304 8
	foot^2 (ft^2)	meter^2 (m^2)	*0.092 903 04
	foot^3 (ft^3)	meter^3 (m^3)	0.028 316 85
	inch (in)	meter (m)	*0.025 4
	inch (in)	millimeter (mm)	*25.4
	inch^2 (in^2)	millimeter (mm^2)	*645.16
	inch^2 (in^2)	meter^2 (m^2)	*0.000 645 16
	inch^3 (in^3)	meter^3 (m^3)	0.000 016 387
	meter (m)	foot (ft)	3.280 84
	meter^2 (m^2)	foot^2 (ft^2)	10.763 9
	meter^3 (m^3)	foot^3 (ft^3)	35.314 7
	meter (m)	inch (in)	39.370 1
	meter^2 (m^2)	inch^2 (in^2)	1550.00
	meter^3 (m^3)	inch^3 (in^3)	61023.8
	millimeter (mm)	inch (in)	0.039 37
	millimeter^2 (mm^2)	inch^2 (in^2)	0.001 55
LIGHT	footcandle (ft-C)	lux (lx)	10.763 91
	footlambert (ft-L)	candela/meter^2 (cd/m^2)	3.426 259
	lux (lx)	footcandle (ft-C)	0.092 903
	candela/meter^2 (cd/m^2)	footlambert (ft-L)	0.291 864
WEIGHT, FORCE, TORQUE, PRESSURE	ounce (ozf)	newton (N)	0.278 013 9
	ounce-inch (ozf•in)	newton meter (N•m)	0.007 061 55
	pound (lb avoirdupois)	kilogram (kg)	*0.453 592 37
	pound-force (lbf)	newton (N)	4.448 222
	pound•inch (lbf•in)	newton meter (N•m)	0.112 984 8
	pound/square inch (psi)	pascal (Pa)	6894.757
	newton (N)	ounce-force (ozf	3.596 94
	newton meter (N•m)	ounce•inch (ozf•in)	141.611
	kilogram (kg)	pound (lb)	2.204 62
	newton (N)	pound-force (lbf)	0.224 809
	newton•Meter (N-m)	pound•inch (lbf•in)	8.850 75
	pascal (Pa)	pound/square inch (psi)	133.322

PREFIXES

Nano(n)	10^{-9}	Centi(c)	10^{-2}
Micro(μ)	10^{-6}	Kilo(k)	10^{3}
Milli(m)	10^{-3}	Mega(M)	10^{6}

*Indicates exact conversion

TEMPERATURE CONVERSION

$^{o}C = 5/9\ (^{o}F - 32)$

$^{o}F = 9/5\ ^{o}C + 32$

Mission profile *acq*. A time phased description of operational events and environments an item experieces from beginning to end of a specific mission identified are tasks, events, durations, operating conditions and environment.

Mode *gen*. Present condition (status) of the product, e.g., off, standby, on.

Modified Rhyme Test (MRT) *snv*. See "Speech intelligibility."

Mouse *uci*. A finger- or hand-held computer input device that generates the coordinates of a position indicator (e.g., converted to analogous movements of a cursor across a screen) and is operated by being moved on a flat surface.

Night vision goggles *gen*. Goggles which amplify visible and near infrared energy, allowing a person to see in the dark.

Night vision goggle compatibility (NVGC) *gen*/*acq* The phrase NVG compatible lighting has taken on at least three distinctly different meanings. The original meaning was the designing of displays or lighting such that the display of lighting was easily visible or usable by the unaided eye but did not interfere with the operation of the night vision goggles. This definition is closest to the "Friendly" lighting mode noted below. The following terms and definitions are subsets of the phrase "NVG compatible."

NVG Secure. visible light emitted from displays is reduced to the minimum needed to do the mission, and the near IR (infrared) content is reduced to less than a fraction of the visible light as specified by the acquiring activity.

NVG Friendly. Exterior lighting that is fully usable by people without NVGs (i.e. typically meets FAA requirements for visibility) but has drastically reduced IR content so that it can be used while flying formation with aircraft in which NVGs are being used (for example, going to and from training site through civilian airspace.)

NVG Covert - IR lights. Lighting that is filtered so they are not visible to the naked eye beyond a few tens of feet, intended to provide illumination so that NVGs will work in areas without adequate natural light.

Noise criterion (NC) curves *snv*. Widely accepted sets of octave-band pressure levels used as the basis for indoor noise criteria. These criteria specify the maximum level permitted in each octave band for various types of communication requirements.

Noise-cancelling (microphone) *snv*. A feature that reduces the masking effect of ambient noise upon speech impressed on a microphone, usually by providing equal access of the ambient noise to both surfaces of a diaphragm to achieve approximate equilibrium, effectively causing the noise to cancel itself out. Since the talker's own voice output impinges on one side of the microphone diaphragm, the talker's signals are not subject to this cancellation, and so are transmitted more favorably than if both ambient noise and speech fell simultaneously upon one face of the diaphragm.

Nuclear, biological, chemical (NBC) survivability *gen*. The instantaneous, cumulative, and residual effects of NBC weapons upon a system including its personnel. NBC survivability describes the capability of a system to withstand the NBC environment, including decontamination, without losing the ability to accomplish its mission. For any system to be considered survivable in an NBC contaminated battlefield, it must have at least three essential characteristics: hardness, decontaminability, and compatibility:

Hardness. The ability of materiel to withstand the materiel damaging effects of NBC contamination and any decontaminants and procedures required to remove it.

Decontaminability. The ability to make personnel and materiel safe by absorbing, destroying, neutralizing, making harmless, or removing chemical or biological agents, or by removing radioactive material clinging to or around them.

Compatibility. The ability of a system to be effectively operated, maintained, and resupplied by persons wearing the full NBC protective ensemble in all climates for which the system is designed, and for the period specified in the operational requirements document.

Numeric *uci*. A descriptive term used to define a character set containing the digits Ø (ZERO) through 9, and generally a limited number of punctuation marks.

Numeric keypad *uci*. A numeric keypad is a keyboard type entry device dedicated to the entry of numeric data.

Octave (or octave band) *snv*. A band of frequencies in which the ratio of the upper band-edge frequency to the lower band-edge frequency is equal to 2:1. The band-center frequencies are the preferred frequencies as specified in ANSI S1.6. The width of an octave band in Hz is approximately 71 percent of its mid-band frequency.

One-third octave band *snv*. One-third octave bands whose band-center frequencies are preferred one-third octave bands specified in ANSI S1.6. The width of a one-third octave band is approximately 23 percent of its band-center frequency.

Operational mode *gen*.. In ground systems, each activity/maneuver during which noise levels are effectively constant.

Operator *gen*. A human performer; one who operates a (specified) item; such as a test set operator, a crane operator, a tool operator, a valve operator (it is used in human factors in the conventional sense as distinguished from the operations-maintenance dichotomy).

Operator *uci*. See "user."

Optical character recognition (OCR) *uci*. The machine identification of printed characters through use of light-sensitive devices.

Optical character recognition (OCR) device *uci*. A device that transcribes information directly from a hard copy onto a computer memory device.

Optimal visual zone *gen*. Refers to a 30 degree cone symmetrical about a line from the design eye position extending outward to the center of the instrument panel, the apex of the cone being at the design eye.

Organizational maintenance *acq*. That maintenance authorized for the responsibility of and performed by a using organization on its assigned equipment. In aeronautical systems, organizational maintenance normally consists of pre-flight, post-flight, and periodic inspection of aircraft; daily or minor inspection of other material, servicing, preventive maintenance, calibration of systems, and removal and replacement of components.

Output *uci*. See "data display."

Overall layout drawings *acq*. System design drawings which include but are not limited to: (1) the configuration and arrangement of major items of equipment for manned stations, such as a pilot's or astronaut's station, or launch control officer's station, or shipboard command station; (2) the configuration and arrangement of items of equipment, such as modular rack or maintenance ground equipment, which may not be a part of a manned station for operation, but require human access for maintenance; (3) the arrangement of interior lighting for operating or maintaining the equipment; and (4) labels identifying general panel content, e.g., flight mission panel, countdown status panel, communications panel, or malfunction status panel.

Page *uci*. The data appearing at one time on a single display screen. Can also refer to standard keyboard keys used to move from one "page" of data to another or to the process of accomplishing this action.

Panel *gen*. The front face of an assembly, normally used for mounting controls and displays.

Panel layout drawings *acq*. Equipment detail drawings which include, but are not necessarily limited to: (1) a scale layout of the controls and displays on each panel or an item of equipment, such as an astronaut's, pilot's or launch control officer's console; (2) a description of all symbols used; (3) identification of the color coding used for displays and controls; (4) the labeling used on each control or display; and (5) the identification of control type (e.g., alternate action or momentary) and a clear differentiation between controls and indicators.

Panning *uci*. An orientation of display framing in which a user conceives of the display frame as moving over a fixed array of data. The opposite of scrolling.

Part *acq*. One piece, or two or more pieces joined together which are not normally subject to disassembly without destruction of designed use, (Examples: outer front wheel bearing of a 3/4 ton truck, computer chip, composition resistor, screw, gear, mica capacitor, audio transformer, milling cutter.)

Peak A-weighted sound pressure level *snv*. The A-weighted sound pressure level measured by a peak reading sound level meter or a combination of instruments with equivalent characteristics, such as a sound level meter and an impact meter, or a sound level meter and a calibrated oscilloscope, where the sound level meter has a peak sound pressure level measuring circuit with total rise time of 200 microseconds or less.

Peak-clipping (of speech signals) *snv*. A technique for controlling amplitude relationships in speech by limiting the excursions of instantaneous peak-amplitudes to improve intelligibility of speech, usually followed by amplification of the signal to increase the amplitude of the clipped peaks to their original level, with proportional increase of the weaker speech sounds.

Peak pressure level *snv*. The highest level, in dB, achieved. (Peak pressure is the highest level, in Pa, achieved). Conversion between either kPa or psi and dB is shown in Figure 3. The reference pressure is 20 µPa (peak). (See dBP)

Personal hearing protection *snv*. Personal protective equipment (e.g., helmets, headsets, earmuffs, earplugs, or other approved protective equipment) that attenuates ambient noise levels in the ear canal.

Phonetically balanced (PB) monosyllabic word intelligibility test *snv*. See "Speech intelligibility."

Pointer *dsi*. A transmittable symbol under the direct control of the operator, used to point to displayed information, for highlighting or identifying areas of interest.

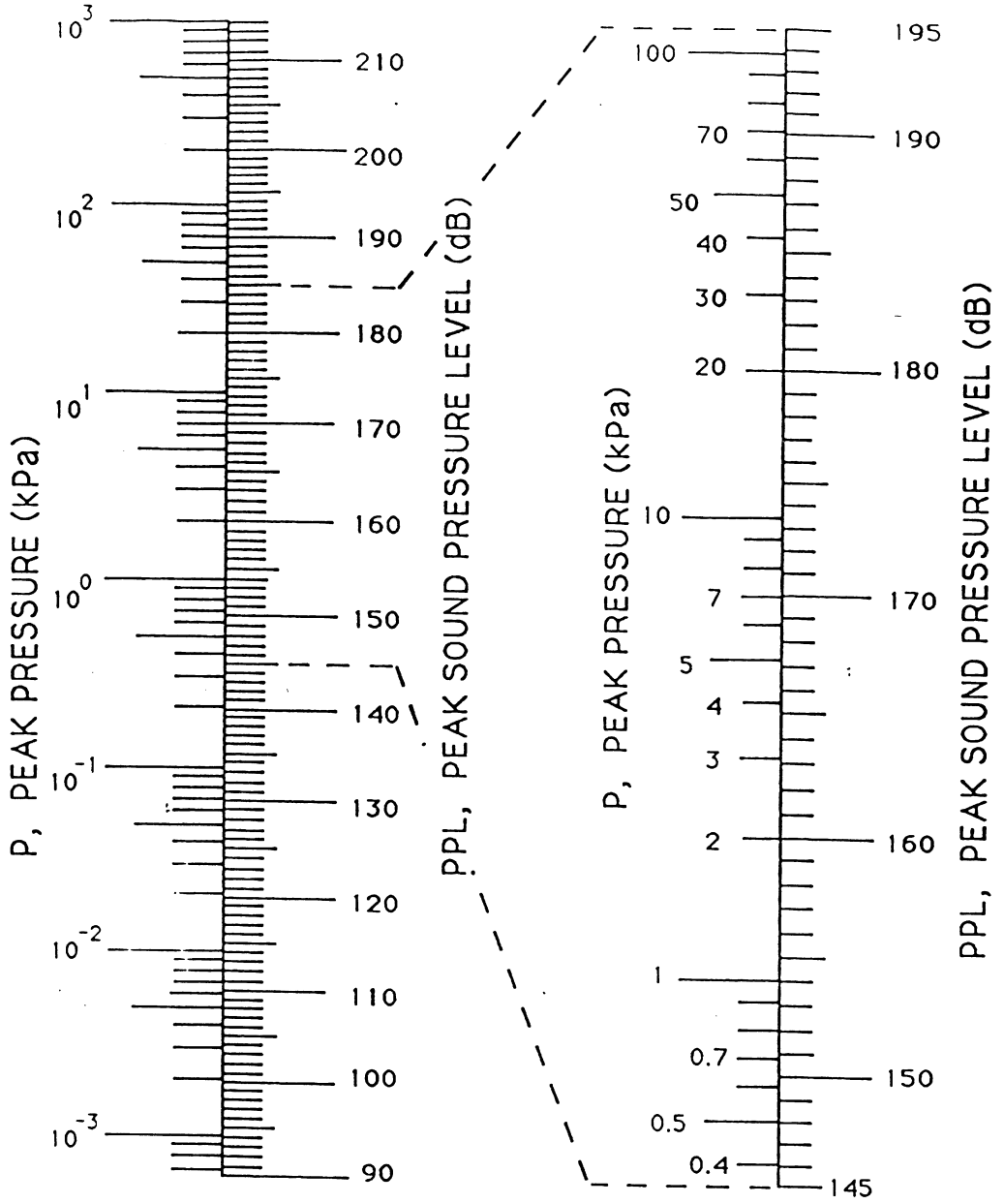

FIGURE 3. Scale for conversion between kPa and dB

Position designation *uci*. User selection and entry of a position on a display, or of a displayed item. (See "Cursor.")

Predictive information *dsi*. Information predicting future status, condition, or position of a system, or a subsystem.

Pre-emphasis *snv*. Systematic distortion of the speech and/or audio spectrum to attempt to improve intelligibility of speech and/or signal-to-noise ratio by emphasizing the high frequency (usually 1 kHz and higher) portion of the speech or other audio signal.

Primary controls *gen*. The most important and frequently used devices designed to control equipment and systems.

Primary display *uci*. The display that is most accessible to the user and usually the one most frequently used.

Prime visual signal area (PVSA) *gen*. The PVSA is an area of the instrument panel which is enclosed by a circular arc whose radius is 30 cm (12 inches) and whose center is defined by the intersection of the top of the instrument panel and the crew members' vertical centerline plane. The area is the optimum location on the instrument panel for the pilot's flight instruments and the master caution and warning lights.

Prompt *uci*. A cue or reminder provided by the computer that alerts and guides the user to take some action.

Protanope *gen*. A user with deficient red-sensitive color vision.

Qualitative information *dsi*. Information presented by a display in a manner which permits the display user to assess the information without requiring attention to an exact numerical quantity.

Quantitative information *dsi*. Information presented by a display in a manner which permits the display user to observe or extract a numerical value associated with the information. Quantitative information may be displayed in either digital or analog form.

Query language *uci*. A type of dialogue in which users compose control entries for displaying specified data from a data base.

Question and answer *uci*. A type of dialogue in which the computer displays questions, one at a time, for a user to answer.

Random incidence corrector *snv*. A device that reduces the directionality of free field microphones allowing their use in diffuse or random incident sound fields.

Raster-written cathode ray tube display *gen*. A method of refreshing the information displayed on a cathode ray tube in which the electron beam scans the entire screen in some predetermined pattern, refreshing portions of the screen as necessary. Variations of the raster method include (1) the noninterlace method, which involve scanning every line in succession and, when finished with the entire display, returning to the beginning and repeating the process and (2) the interlace method, in which every other line is scanned on one pass, the remaining lines are scanned on the next pass, and the process is repeated.

Rated engine speed *snv*. If not specified (for acoustic testing), 10% less than maximum governed engine speed with no load.

Record *uci*. A group of related data fields that are operated on as a single entity in a database.

Remote tracks *dsi*. Tracks generated by other than the co-located sensors upon which the air defense system relies to *acq*uire targets, e.g., tracks received from interfacing systems.

Restart *uci*. A capability that returns a user to the first display in a defined transaction sequence.

Risk *gen./acq*. An expression of possible loss of function and/or degradation in performance in terms of severity and probability.

Scenario/conditions *acq*. See "Task analysis."

Screen *uci*.. The viewing surface of a cathode ray tube. Also see "Page."

Scrolling *uci*.. An orientation for display framing in which the user conceives of data as moving behind a fixed display frame. The opposite of panning or windowing.

Seat reference point (SRP) *gen*.. The point at which the center line of the seat back surface (depressed) and seat bottom surface (depressed) intersect. When the seat is positioned at the midpoint of the adjustment range(s), this intersection point is called the neutral seat reference point (NSRP).

Sequence control *uci*.. Logic and means by which user actions and computer responses are linked to become coherent transactions

Shift mode *uci*. (Also shifted mode.) The condition of the keyboard when a SHIFT key is operated. In this mode, the alphabetic keys are associated with the uppercase letters, other character keys with the corresponding upper graphic symbol, and certain function keys with alternate functional operations.

Simulator sickness *gen*. A form of motion sickness induced in a virtual environment. Symptoms range from cold sweats and stomach awareness, to vomiting. Depending on their severity, the symptoms may degrade operator/system performance.

Soft copy *uci*. In computer graphics or telecommunications, data stored, transmitted, or displayed in an electronic format.

Sound level *snv*. The quantity in dB measured by a sound level meter satisfying the requirements of ANSI S1.4. Sound level is the frequency weighted sound pressure level obtained with the standardized dynamic characteristics "fast" or "slow" and weighting A, B, or C. If the weighting employed is not indicated, A-weighting is understood.

Sound pressure level (SPL) *snv*. Ten times the logarithm to the base 10 of the ratio of the time-mean-square pressure of a sound in a stated frequency band, to the square of the reference sound pressure in gases of 20 micropascals, i.e.,

$$SPL = 10\ Log_{10}\left(\frac{P}{20\mu Pa}\right)^2 = 10\ Log_{10}(P^2) + 94$$

where P = the effective (rms) sound pressure in pascals (Pa) or newtons per square meter (N/m^2). (20 μPa = 20 $\mu N/m^2$ = 0.0002 microbar = 0.0002 dynes/cm^2.)

Source document *uci*. The user's application document, which is a source of data eventually processed by the computer program. Examples include time cards, target lists, vouchers, supply codes, parts lists, and bills of lading.

Special tools *acq*. Tools not listed in the Federal Supply Catalog.

Spectroradiometer *gen*. A radiometer equipped with a device for separating (dispersing) the incoming light into its component wavelengths, used to measure the spectral power distribution.

Speech intelligibility *snv*. A measure of the percentage of words, phrases or sentences correctly understood over a given speech communication system in a given noise situation. It may be measured by either the Phonetically Balanced (PB) Monosyllabic Word Intelligibility Test or the Modified Rhyme Test (MRT). The former consists of a list of 1,000 words in which each word is spoken and written down by a listener. The latter consists of a list of 300 words in which a word is spoken and the listener responds on a prepared multiple format selecting one of six words as the item heard. Speech intelligibility may also be predicted by the Articulation Index (AI) in which calculation is performed on the peak-speech-to-root-mean-square noise ratio obtained in selected frequency bands from 200 to 7,000 Hertz, i.e., peak amplitude of speech in relation to the root-mean-square amplitude of the background noise.

Speech signal processing *snv*. The modification of the electrical signal representing speech to enhance the capability of a speech communications channel. Some examples are simple analog processing, automatic gain control (AGC), frequency shaping, peak clipping, and syllabic compression.

Speech spectrum *snv*. A segment of the range of audible frequencies containing the sounds of speech, defined as approximately the range from 80 to 8000 Hz.

Speech-to-noise ratio (peak speech-to-rms noise) *snv*. The ratio between the arithmetic mean of peak amplitudes of speech and the root mean square (rms) amplitude of background noise.

Standard tools *acq*. Tools (normally hand tools) used for the assembly, disassembly, inspection, servicing, repair and maintenance of equipment, and which are manufactured by two or more recognized tool manufacturing companies and listed in those companies' catalogs.

State-of-the-art *acq*. The highest level of scientific and technical knowledge existing at the time of contract award.

Status information *gen*/*dsi*. Current condition information about the system and its surroundings.

Steady-state noise *snv*. A periodic or random variation in atmospheric pressure at audible frequencies. It may be continuous, intermittent or fluctuating, with the sound pressure level varying over a wide range, provided such variations have a duration exceeding 1 second.

String *uci*. In the user's context, a word, phrase, or number (string of characters) in the test or file. Normally employed in the context of causing the computer to search for, find, or replace a desired "string."

Stroke-written cathode ray tube display *gen*. A cathode ray tube in which the character *gen*erator *gen*erates a succession of short strokes in sequence that are combined to form a character or symbol.

Subassembly *acq*. Two or more units which form a portion of an assembly or a unit replaceable as a whole, but having a part or parts which are individually replaceable. (Examples: gun mount stand, window recoil mechanism, floating piston, telephone dial, IF strip, mounting board with mounted parts, power shovel dipper stick.)

Subsystem *acq*. A combination of sets, groups, etc., which performs an operational function within a system and is a major subdivision of the system. (Examples: Data processing subsystem, guidance subsystem, display subsystem.)

Subtask *acq*. See "Task analysis."

Support equipment (SE) *acq*. All equipment required to perform the support function, except that which is an integral part of the mission equipment. SE includes tools, test equipment, automatic test equipment (ATE) (when the ATE is accomplishing a support function), organizational, intermediate, and related computer programs and software. It does not include any of the equipment required to perform mission operations functions.

Symbol *dsi*. A geometric form or alphanumeric information used to represent the state of a parameter on a display.

Symbol size *dsi*. Actual symbol size at the display, based on design eye distance from the display, can be calculated using the following formula:

$$L = 2D \tan (a/2)$$

where: L = size of symbol at the display
D = design eye distance from the display
a = symbol subtense (degrees) at D

Example: The breakaway symbol is 100 mrad long. What is the size of the symbol at the display in cm, if the design eye distance is 71 cm (28 inches)?

$$a = 100 \text{ mr} \times \frac{0.0573}{\text{mr}} = 5.73 \text{ degrees}$$

$$L = 2(71) \tan (5.73/2) = 7.11 \text{ cm}$$

The same formula can be used for simple magnifier type HUD displays by replacing "D" with the effective focal length of the HUD optics. This formula assumes the angle of incidence of viewing the display is 90 degrees. If it is other than 90 degrees, the symbol size should be increased by dividing L by the cosine of the angle of deviation from 90 degrees.

System *acq*. A composite of equipment, skills, and techniques capable of performing or supporting an operational role, or both. A complete system includes all equipment, related facilities, material, software, services, and personnel required for its operation and support to the degree that it can be a self-sufficient unit in its intended operational environment. (Examples: STINGER, AEGIS, F-15.) When GFE is required for system operation, whether or not operation with GFE occurs in all cases of system operation, that GFE is part of the system.)

System layout drawings *acq*. System design drawings which include but are not limited to: (a) the configuration and arrangement of items of equipment for manned stations (such as a pilot's station, astronaut's station, launch control officer's station, shipboard command station, and tank commander's station) and multiple crew stations and positions; and (b) the configuration

and arrangement of items of equipment, such as modular rack or maintenance ground equipment, which may not be a part of a manned station for operation, but require human access for maintenance.

Systems engineering *acq*. The program manager should ensure that a systems engineering process is used to translate operational needs and/or requirements into a system solution that includes the design, manufacturing, test and evaluation, and support processes and products. The systems engineering process should establish a proper balance between performance, risk cost, and schedule, employing a top-down iterative process of requirements analysis, functional analysis and allocation, design synthesis and verification, and system analysis and control. Representative human engineering activities in systems engineering may include the following:

a. Preparing operationally-realistic mission profiles and mission scenarios.

b. Preparing functional flow block diagrams for the system.

c. Undertaking a functional analysis of each flow block and definition of operational and support equipment and facilities requirements.

d. Preparing system and subsystem schematic block diagrams.

e. Studying detailed functions, environment and technical design requirements to allocate assignment of tasks to personnel, equipment, software, or some combination thereof.

f. Preparing operations and maintenance timeline analyses to determine system reaction time.

g. Preparing and analyzing operational and maintenance task data to determine equipment quantities, personnel loads, and system down-time for scheduled and unscheduled maintenance.

h. Considering training implications.

i. Conducting trade studies.

j. Participating in preparation of specifications for the system.

k. Participating in design reviews, demonstrations, and test/evaluation activities

l. Influencing design of software and hardware user interfaces and applicable processes.

Tailoring *acq*. The process by which individual requirements (paragraphs or sentences) of the selected specifications, standards, and related documents are evaluated to determine the extent to which they are most available for a specific system and equipment acquisition and the modification of these requirements to ensure that each achieves an optimal balance between operational needs and cost. The tailoring process must, however, conform to provisions of existing regulations governing human factors engineering program and take care not to exclude those requirements which are determined as essential for meeting minimum operational needs.

Task *acq*. See "Task analysis."

Task analysis *acq*. A systematic method used to develop a time-oriented description of personnel-equipment/software interactions brought about by an operator, controller or maintainer in accomplishing a unit of work with a system or item of equipment. It shows the sequential and simultaneous manual and intellectual activities of personnel operating, maintaining or controlling equipment, in addition to sequential operation of the equipment. It is a part of system engineering

analysis where system engineering is required. The following taxonomy is used to inventory or analyze tasks, with mission and scenario conditions stated by the procuring activity and the remaining levels dependent on the current phase of system development and purpose (e.g., gross analysis of tasks, analysis of critical tasks) for which the analysis is being conducted:

Mission. What the system is supposed to accomplish, e.g., combat reconnaissance.

Scenario/conditions, Categories of factors or constraints under which the system will be expected to operate and be maintained, e.g., day/night, all weather, all terrain operation.

Function. A broad category of activity performed by a system, e.g., transportation.

Job. The combination of all human performance required for operation and maintenance of one personnel position in a system, e.g., driver.

Duty. A set of operationally-related tasks within a given job, e.g., driving, weapon servicing, communicating, target detection, self protection, operator maintenance.

Task. A composite of related activities (perceptions, decisions, and responses) performed for an immediate purpose, written in operator/maintainer language, e.g., change a tire.

Subtask. An activity (perceptions, decisions and responses) which fulfills a portion of the immediate purpose within the task, e.g., remove lug nuts.

Task element. The smallest logically and reasonably definable unit of behavior required in completing a task or subtask, e.g., apply counterclockwise torque to the lug nuts with a lug wrench."

Task element *acq*. See "Task analysis."

Task inventory *gen*. A comprehensive listing of all tasks performed by system personnel.

Task statement *gen*. A task statement is a description of a task. It is composed of three basic elements: (1) an action verb which states what is to be accomplished in the task, (2) an object which identifies what is to be acted upon in the task, and (3) any qualifying phrases needed to distinguish the task from related or similar activities, limit and define the scope of the task, and clearly communicate the nature of the task. The third element is often added only when needed for clarification.

Terminal *uci*. An input/output device used to enter and display data. Data are usually entered via a keyboard, and are usually displayed via a video screen ("soft copy") or a printer ("hard copy").

Text entry *uci*. Initial entry and subsequent editing of textual material, including messages.

Three-dimensional audio technology (3D audio) *gen*. A combination of hardware and software which manipulates a monaural audio signal in such a way as to give the illusion, when listened to via headphones, that the sound originates at a particular spatial location.

Time-weighted average level (L_{avg}) *snv*. The time-weighted sound level dBA that is derived from the actual varying sound level of the source during a given sample time (T), Implicit in this derivation is an exchange between sound level and time of Q dB per doubling of time. The criterion level is 85 dBA for a duration of 8 hours.

$$L_{avg} = \frac{Q}{\log_{10} 2} \log_{10} \left\{ \frac{1}{T} \int_0^T 2^{L(t)/Q} \, dt \right\}$$

where: T = total time in hours
t = varying time
L(t) = the time varying A-weighted sound pressure level
Q = exchange rate, usually 3, 4, 5, or 6 dB.

The L_{avg} value can be calculated from the following alternate expression when the sound level takes on a sequence of N constant levels, L_i, each lasting for a time period of C_i hours:

$$L_{avg} = 85 + \frac{Q}{\log_{10} 2} \log_{10} \left(\frac{8D}{T} \right)$$

where: $D = \sum_{i=1}^{N} \frac{C_i}{T_i}$

T_i = Limiting exposure time at each A-weighted sound pressure level = $\frac{8}{2^{(L_i - 85)/Q}}$

L_i = i^{th} A-weighted sound pressure level.

The exchange rate must be specified when referring to L_{avg}.

Toggle switch gen/acq. A lever operated control with discrete positions.

Total daily exposure (TDE) *snv*. The ratio of actual daily noise exposure to allowable daily noise exposure.

Touch pad *uci*. A control device that allows the user to control cursor movement in any direction by moving the finger across the top of a touch sensitive pad.

Touch screen *uci*. A control device that allows the user to communicate with the computer by touching the screen. Touch screens can be operated using two different strategies: (1) The first contact strategy actuates the point at which the operator makes contact with the display screen; (2) the “last contact” strategy actuates the point at which the operator withdraws his/her touch from the display screen.

Trackball *uci*. A control device with which the user can control cursor movement in any direction by rotating the ball. Trackballs are especially useful when it is desirable to move the cursor long distances quickly.

Transaction *uci*. An action by a user followed by a response from the computer. The term is used here to represent the smallest functional "molecule" of user-computer interaction.

Transient sounds *snv*. Sounds that occur during turn-on and turn-off of the equipment and infrequent sounds that are less than 15 seconds in duration. If sounds occur at intervals of 1/2 second or less, the sound is considered steady-state sound.

Transillumination *gen*. Light passing through a diffusing element to be viewed, e.g., the illumination produced by edge- or back-lit sources that make translucent console panels or indicators

visible in the dark. A variety of illuminating sources are available, to include incandescent, fluorescent, or sandwich-type (electroluminescent panels).

Transmission control *uci*. Controlling the sequence, content, format, routine, timing, or other data transmission characteristics.

Trouble shooting *gen*. Actions performed to isolate and identify the specific component which caused a malfunction of a system or complex component.

Unit *acq*. An assembly or any combination of parts, subassemblies and assemblies mounted together normally capable of independent operation in a variety of situations., (Examples: hydraulic jack, electric motor, electronic power supply, internal combustion engine, electric generator, radio receiver.) This term replaces the term "component." Note: The size of an item is a consideration in some cases. An electric motor for a clock may be considered as a part inasmuch as it is not normally subject to disassembly.

Uppercase letters *uci*. The "Capital" letters.

User *uci*. Any person who uses an information system in performing a job.

User-computer interface (*UCI*) *uci*. The modes by which the human user and the computer communicate information and by which control is commanded, including areas such as: information presentation, displays, displayed information, formats and data elements; command modes and languages; input devices and techniques; dialog, interaction and transaction modes; timing and pacing of operations; feedback, error diagnosis, prompting, queuing and job performance aiding; and decision aiding.

User-system interface *uci*. All aspects of information system design that effect a user's participation in information-handling transactions.

Value *uci*. Specified data for a particular dimension, field, or variable. For example, values for an aircraft's speed might be 800 knots during one observation and 500 knots during another. Also see "category."

Variable *uci*. See "Dimension," "Data field."

Vertical situation display (VSD) *dsi*. A situation display having all of the features of an Electronic Attitude Director Indicator (EADI), with the increased capability of displaying sensor data. Additional modes may consist of TV, infrared (IR), attack radar, weapon TV, or terrain-following radar. Specific symbols and formats can be selectable for a given mode of operation. When any mode, other than one of the primary EADI modes is selected, the VSD may present basic symbolic information for flight control superimposed on the sensor data. VSD formats generally do not use sky/ground shading.

Vibration level *snv*. The logarithm of the ratio of a vibratory quantity to a reference quantity of the same kind, with the base of the logarithm, the reference quantity, and the kind of level indicated.

Warning signal *gen*. A signal which alerts the operator to a dangerous condition requiring immediate action. (See "Master caution [warning] signal").

Weapon system *gen*. A composite of equipment, skills, and techniques that forms an instrument of combat. The complete weapon system includes all related equipment, material, services, and personnel required solely for operation, or other major elements of the system, so that the instrument of combat becomes a self-sufficient unit of striking power in its intended operational environment.

Wet bulb globe temperature (WBGT) *gen.* A meteorological measurement which can be used as an index to designate conditions of temperature and humidity at which on-set of heat stress can be expected at a particular energy expenditure level. It is calculated as follows:

$$WBGT = 0.7T_{WB_{np}} + 0.2T_g + 0.1T_A$$

where $T_{WB_{np}}$ = non-psychrometric (np) wet-bulb (WB) temperature

T_g = temperature at interior center of a 15.2 cm (6 in) black globe)

T_A = non-psychrometric, but shaded, dry bulb (air) temperature.

Work station *uci*. The general physical environment in which the user works. It includes such things as computer terminals, source documents, desks, chairs, and lighting. Also used to refer to a computer terminal capable of sophisticated stand-alone operation, such as computer-aided-design, computer-aided-engineering, and desktop publishing.

4. NOTES

(This section contains information of a *gen*eral or explanatory nature that may be helpful, but is not mandatory.)

4.1 Intended use. This handbook is intended for use in conjunction with current human factors and related specifications, standards, and handbooks to define terms, frequently used in those documents, and thereby provide consistency, eliminate overlap and duplication, and minimize repetition. For these same reasons, this handbook is also intended for reference during the preparation of new human factors and related specifications, standards, and handbooks. Telecommunication terms in this handbook are consistent with those in FED-STD-1037B. Use of telecommunication terms in new human factors standardization documents that do not appear herein should use or harmonize with applicable definitions in the current revision of FED-STD-1037.

4.2. Subject term (key word) listing.

Abbreviations
Acoustics
Acquisition/programmatic
Acronyms
Display symbology
Human factors engineering
Terminology
User/Computer interface
Vibration

4.3. Changes from previous issue. The margins of this handbook are marked with vertical lines to indicate where changes from or additions to the previous issue were made. The margins are also marked with asterisks to identify deletions. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Editorial changes are not indicated by margin notations.

CONCLUDING MATERIAL

Custodians:
Army - MI
Navy - AS
Air Force - 11

Preparing activity:
Army-MI
(Project HFAC-0089)

Review activities:
Army - AR, AT, AV, CR, EA, GL, MD, MR, PT, TE, TM
Navy - CG, EC, MC, ND, OS, PE, SH, TD
Air Force - 01, 10, 13, 19, 31
OSD - HS, SE
DLS - DH
DISA - DC2
NIMA - MP
NSA - NS

Industry associations and professional societies:
AAMI
AIA
ASTM
EIA
HFES
SAE

Civil A*gen*cy Coordinating Activities:
DOT - FAA
NASA - AE
NHTSA - OST