
Guidelines for JSAE Annual Congress Manuscripts

The 28th edition (October 9, 2018)

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10-2 Gobancho, Chiyoda-ku, Tokyo 102-0076
Society of Automotive Engineers of Japan, Inc.

I. Manuscripts o Proceedings Paper and Summarized Paper Drafting Procedure, and PDF Conversion Procedure

1. Drafting Procedure of Manuscript

- (1) Official Languages
Japanese or English, which must be same for oral presentation
- (2) File Format
PDF
- (3) Color
Drawings and photos may be submitted in color.
- (4) Format (*Be sure to use the manuscript template posted on the JSAE Annual Congress website*)
 - ① Page Setup
A4 size; 25mm top and bottom margins / 18mm right and left margins
 - ② Columns and Lines
Two-column layout / 47 lines per column / 27 characters per line
Column height 247 mm / Column width 84.5 mm / 5 mm between left and right columns
 - ③ Pages

Japanese manuscript	Up to 6 pages
English manuscript	Up to 8 pages
- (5) Manuscript (*Please refer to the manuscript sample on the JSAE Annual Congress website*)
 - ① Presentation Number and Document Control Number
The administrator will add the Presentation Number and Document Control Number. Authors should not add these numbers.
 - ② Main Title
If the presentation is one in a series of related presentations, append “(Report No. X)” to the main title.
⇒ 16-point, Times New Roman, upper and lower case
 - ③ Sub-title
Avoid using a sub-title as much as possible, unless a sub-title is necessary to provide a supplementary explanation.
Place a dash “-”, at the beginning and the end.
⇒ 11-point, Times New Roman, upper and lower case
 - ④ Authors’ Names
 - a. Put the main author’s name first, including first and last names.
 - b. If there are multiple authors, limit the cited names only to those who made a significant contribution to the research.
 - c. Omit positions, ranks, and titles.
 - d. Append a superscripted footnote number followed by a right parenthesis to each author’s name. For authors of same affiliation give the same number.
Examples: Taro Jidosha ¹⁾ John Smith ²⁾
⇒ 11-point, bold, Times New Roman
 - e. Append an underline to the speaker’s name.
Example: John Smith ²⁾
 - ⑤ Abstract
Explain the essential points in 100 words or less
⇒ 9-point, Times New Roman
 - ⑥ Keywords
 - a. Select each keyword from Categories 1, 2, and 3 in the Standardized Keywords list.
A selection must be made from Category 1.
 - b. Select suitable keywords from the title, abstract or main text that are related to the content of the paper.
 - c. Put the word “Standardized” before the Standardized Keywords, and “Free” before the Author-selected keywords
⇒ (Standardized keywords) 9-point, bold, Times New Roman, upper and lower case
(Author-selected keywords) 9-point, Times New Roman, upper and lower case
 - ⑦ Category Code
Select a Category Code from the Standardized Keywords list, and put the code after the keywords inside square parentheses ().
⇒ 9-point, Times New Roman

- ⑧ Main Text
Clearly describe the purpose, contents, and conclusion of the research, while complying with the ethical guidelines of the JSAE. Company and product names, terminology whose usage is restricted to within a particular company, and commercial content may not be included in the main text.
⇒ 9-point, Times New Roman
- ⑨ Figures (and Photographs) and Tables
Place figure titles below the figures and table titles above the tables.
⇒ Titles: 9-point, Times New Roman
⇒ Characters in figures and tables: 7-point or larger
- ⑩ Information of Authors
- Put the authors' affiliations, addresses (including zip codes), and email addresses in italics under the authors' names.
 - Collect multiple authors working for the same affiliation above a single address.
 - Put the presentation date and congress name under the authors' information.
⇒ 9-point, Times New Roman
Example: **Main author's Name**¹⁾ **Co-author's Name**¹⁾ **Co-author's Name**²⁾
*1), 2) The University of JSAE, Graduate School of Engineering
10-2 Gobancho, Chiyoda, Tokyo, 102-0076, Japan (email: taro@jsar.or.jp)*
- ⑪ Manuscript Publication (Release) Date
The administrator will add the name and publication (release) date of the presentation in the footer on page 1. Authors should not add this information.
- ⑫ References
References are listed after the main text of the paper. Where a reference is cited, enter the superscripted number of the reference in parentheses at the appropriate location in the text. The format for reference entries is described in SIST 02-2007.
⇒ 9-point, Times New Roman
Example: Michael J. Fox: Vehicle Dynamics System, SAE Technical Paper (2014),
2014-01-0000, doi:10.4271/2014-01-0000
- ⑬ Other Important Points
- Please avoid the use of company names, product names, and commercial content in the title and text.
 - Manuscripts describing research involving human subjects must state that experiments and so on were accepted by an Ethics Review Board or the like and that the participants in these experiments provided their informed consent.
 - Assign numbers to chapters, sections, and sub-sections. Each number should be a combination of Arabic numeral(s) and period(s). As a rule, up to 3 levels of headings (chapter, section, and sub-section) can be used.
 - Where an abbreviation is used, use the original term, regardless of whether it is a common noun or proper noun. If the abbreviation is not in general use, then the first time the term appears in the text, use the unabbreviated term followed by the abbreviation in parentheses. Use the abbreviation in all subsequent cases. The character style should be normal.
 - Technical terms shall conform to the technical terms established by the Ministry of Education, as well as to the terminology standards of JIS and JASO. Non-technical terms shall also conform to the terms established by the former Ministry of Education, where applicable. Where the official terms are not applicable, use appropriate common expressions.
 - Where a number with a large number of digits is used, place a comma after every third digit, moving leftward from the decimal point. Commas are not used to the right of the decimal point.
 - Use the International System of Units (SI). For important numerical values, conventional units may also be used.
 - See JIS Z 8202 (Quantities and Units) for quantity symbols, JIS Z 8201 (Mathematical Symbols) for mathematical symbols, the international chemical symbols for chemical symbols, and JIS B 0001 (Technical Drawings for Mechanical Engineering) for drawing symbols.
 - Mathematical equations must be written within the width of a single column and cannot run over to the next column. If the equations are numbered sequentially, place the numbers in parentheses and to the right of the equations. Refer to equations in the text as Equation (1), Equation (2), and so on. Letters and symbols used to indicate equations and physical quantities shall be in italics and units shall be in English.

2. Drafting Procedure of Manuscript of Summarized Paper

- (1) Official Languages
English
- (2) File Format
PDF
- (3) Color
Drawings and photos may be submitted in color.
- (4) Format (*Be sure to use the summarized paper template on the JSAE Annual Congress website.*)
 - ① Text
A4 size; 25mm top and bottom margins / 18mm right and left margins
 - ② Columns and Lines
One column layout / 52 lines per column / 46 characters per line
 - ③ Pages
One page
- (5) Summarized Paper (*Please refer to the Summarized Paper sample on the website of JSAE Annual Congress.*)
 - ① Presentation Number and Document Control Number
The administrator will add the Presentation Number and Document Control Number. Authors should not add these numbers.
 - ② Main Title
⇒ Please refer to Section 1. (5)-②, 16-point, Times New Roman, upper and lower case
 - ③ Sub-title
⇒ Please refer to Section 1. (5)-③, 11-point, Times New Roman, upper and lower case
 - ④ Authors' Names
⇒ Please refer to Section 1. (5)-④, 11-point, bold, Times New Roman
 - ⑤ Author's Place of Employment (Affiliation)
⇒ Please refer to Section 1. (5)-④, 9-point, Times New Roman in italic
 - ⑥ Manuscript Publication (Release) Date
The administrator will add the name and publication (release) date of the presentation in the footer on page 1. Authors should not add this information.
 - ⑦ Keywords
⇒ Please refer to Section 1. (5)-⑥,
(Standardized keywords) 9-point, bold, Times New Roman, upper and lower case
(Author-selected keywords) 9-point, Times New Roman, upper and lower case
 - ⑧ Category Code
⇒ Please refer to Section 1. (4)-⑦, 9-point, Times New Roman inside square parentheses []
 - ⑨ Main Text
⇒ Please refer to Section 1. (4)-⑧, 9-point, Times New Roman
 - ⑩ Figures (and Photographs) and Tables
Please put in at least one figure (or photo) or table that represents the content of the paper.
Place figure titles below the figures and table titles above the tables.
⇒ Titles: 9-point, Times New Roman
⇒ Characters in figures and tables: 7-point or larger

3. Converting to PDF File

- (1) The use of **Adobe Acrobat 8.0** or above is recommended for converting papers to PDF files properly.
- (2) All fonts must be embedded. PDF quality settings must always be set to Press Quality.
- (3) Set the color mode to "Color".
- (4) Set the resolution to at least 300 dpi for color or grayscale figures and photographs, and to at least 600 dpi for monochrome figures and photographs.
- (5) The size of the PDF file should not exceed 8 MB for the manuscript and 1 MB for the Summarized Paper.
- (6) The manuscript and Summarized Paper should be converted into separate PDF files.
- (7) Do not make any security settings on the PDF file.

4. Uploading of PDF File

- (1) Both the manuscript and Summarized Paper must be submitted through the Presentation Registration System after logging in by registration number and password.
- (2) Upload files using the “.pdf” extension.
- (3) The manuscript and Summarized Paper files should be uploaded at the same time. Manuscripts may be reviewed and re-uploaded at any time before the paper submission deadline.
(Papers cannot be revised after the paper submission deadline.)

II. Presentation Slides(e.g. PowerPoint) Drafting Procedure

1. Presentation Documents (e.g. PowerPoint)

- (1) Official Languages
Presentation slides must be described in English for Spring Congress. For Autumn Congress English or Japanese are acceptable.
- (2) File Format
PowerPoint, others
- (3) Contents
 - ① Follow the contents of the manuscript.
 - ② Avoid including commercial content, such as product names, affiliated organization names or their logos. (However, affiliated organization names and the attendant logos may be used on the first page only.)
- (4) Important Points
 - ① Deal with only one topic per page, using one minute per slide as a guideline.
 - ② Limit explanations based on equations or characters to between 7 and 10 lines on a single page. Symbols and characters are easier to read if set to a font size of 24 pt. or higher.
 - ③ Use English for graph or table titles and terms.
 - ④ When presenting English and Japanese side-by-side, translating only the key terms and sentences rather than presenting a full translation is acceptable.
Keep the audience in mind and prepare easy to see and understand presentations.

III. Keywords

1. Keywords

Keywords consist of two types: Standardized and Author-selected.

(1) Standardized Keywords

Select the first keyword from Category 1 in the Standardized Keywords, the second one from Category 2, and the third one from Category 3.

(2) Author-selected Keywords

The author selects suitable keywords from the title and/or main text in accordance with procedure below.

[1] Select phrases that have specific meanings and are as narrowly defined as possible.

(NA) Critical, Speed ⇒ Critical Speed

(NA) Life ⇒ Tool Life, Fatigue Life

[2] Use noun forms

(NA) Studied Experimentally ⇒ Experimental Study

[3] Limit the use of abbreviations to those that are widely and globally used in the particular field.

(As a rule, author-invented terms must not be used.)

(NA) ATC ⇒ Automatic Tool Change, Automatic Train Control

[4] Compound words and phrases must be ones that are commonly used.

(NA) Fatigue Strength at Elevated Temperature

 ⇒ Fatigue Strength, Elevated Temperature

[5] Spell out the full names of alloys, chemical compounds, elements, and nuclides instead of using symbols.

(NA) CrMo Steel ⇒ Chromium Molybdenum Steel

(NA) Al₂O₃ ⇒ Aluminum Oxide

(NA) Cu ⇒ Copper

[6] When there are multiple words with the same or similar meanings, choose the most concise and frequently-used one.

[7] If unsure whether to include or delete any content, include it.

自動車技術会基準キーワード
Automotive Technology: Standardized Keywords

2010年5月発行
Issued: May 2010
2013年10月改訂
Revise: October 2013

(*) … 英略語は末尾にフルスペルを表記
(*): Items marked with an asterisk are spelled out in the definition.

分類 Category Code	目的・分野 Purpose/field	目的の対象 (もの、ハードおよびソフト)	Objects/hardware/software	手法・内容および技術要素	Means/details/component technologies
	第1カテゴリー Category 1	第2カテゴリー	Category 2	第3カテゴリー	Category 3
<p style="text-align: center;">(A1)</p>	①熱機関 heat engine	圧縮着火機関 火花点火機関 予混合圧縮着火 新型機関 ロータリ機関 スターリング機関 ガスタービン/蒸気タービン エンジン部品・要素 ターボチャージャ/VGターボ スーパーチャージャ 可変動弁機構 エンジン補機類 ターボコンパウンド 後処理システム 三元触媒 deNOx触媒/SCR脱硝/NOx 還元触媒 (*) 微粒子フィルタ 燃料/代替燃料 ガソリン/軽油/灯油/重油 エタノール/BDF (*) LPガス/天然ガス/水素 DME/FT合成油 (*) 潤滑油/エンジンオイル	compression ignition engine spark ignition engine homogeneous charge compression ignition new combustion model/new combustion model engine rotary engine/rotary combustion engine Stirling engine gas turbine/steam turbine engine component or element turbocharger/variable geometry turbo supercharger variable valve train engine accessory turbo compound post treatment system three-way catalyst de-NOx catalyst/selective catalytic reduction NOx removal/NOx reduction catalyst particulate filter fuel/alternative fuel gasoline/light oil (gas oil/diesel oil) /heavy oil ethanol/bio-diesel fuel liquefied petroleum gas/natural gas/hydrogen dimethyl ether/Fischer-Tropsch synthetic oil lubricating oil/engine oil	計測/診断/評価 数値計算 設計/制御 理論/モデリング 性能/燃費/効率 燃焼解析 排出ガス/有害排出物 燃料噴射/燃料噴霧 吸排気 過給 混合気形成/ガス流動 燃料改善/燃料改質 添加剤 潤滑/トライボロジー 振動/騒音 冷却	measurement/diagnosis/evaluation numerical calculation design/control theory/modeling performance/fuel economy/efficiency combustion analysis emissions gas/harmful emissions fuel injection/fuel spray intake and exhaust supercharging mixture formation/gas flow fuel improvement/fuel reforming additive lubrication/tribology vibration/noise cooling
<p style="text-align: center;">(A2)</p>	②動力伝達系 power transmission	発進システム 変速機 デファレンシャル/終減速機 MT AT CVT (*) AMT/DCT (*) 新型トランスミッション 動力分配システム AWDシステム (*) ハイブリッドシステム 駆動軸/ジョイント クラッチシステム 歯車/ギアシステム ドライブトレイン ベルトドライブ/トラクションド ライブ/チェーンドライブ 制御システム 油圧システム 同期機構 軸受 潤滑油/トランスミッションオイ	start control system transmission differential/final reduction gear manual transmission automatic transmission continuously variable transmission automated manual transmission/dual clutch new type transmission transfer all-wheel drive system hybrid system drive axle/joint clutch system gear/gear system drivetrain belt drive/traction drive/chain drive control system hydraulic equipment synchromesh bearing lubricating oil/transmission oil	加工 材料 強度 疲労 機構	machining material strength fatigue mechanism
<p style="text-align: center;">(A3)</p>	③EV・HVシステム (*) EV and HV systems	モーター モーター駆動システム インバータ/コンバータ パワーコントロールユニット 電池技術 リチウムイオン電池/ニッケ ル水素電池/鉛電池 SOC (*) 充電/放電 車載充電システム	motor motor drive system inverter/converter power control unit battery technology lithium ion battery/nickel-metal hydride battery (nickel hydrogen battery)/lead-acid battery state of charge (SOC) charge/discharge onboard charging system	モーター特性 電気動力変換 エネルギー回生 システム技術 充電インフラ 動力分割 絶縁 標準化 法規	motor characteristics electric power conversion energy regeneration system technology filling infrastructure power split insulation standardization regulation

(A3)		蓄電システム 電動補機/空調 補機システム プラグインハイブリッド 燃料電池 スタックセル 水素タンク 水素製造/改質 エネルギー充填/水素充填/インフラ エネルギー制御システム ブレーキ制御/回生協調ブレーキ	power storage system electrical accessories/air conditioning accessories plug-in hybrid fuel cell stack cell hydrogen tank hydrogen production/hydrogen reforming energy replenishment/hydrogen filling/infrastructure energy control system brake control/regenerative-friction brake coordination	電気安全(感電防止) EMC (*) 普及政策 エネルギーバランス エネルギーマネジメント 冷却/熱・温度マネジメント	electrical safety (electric shock prevention) electromagnetic compatibility policy of popularization energy balance energy management cooling/heat and temperature management
(B1)	④車両運動 vehicle dynamics	電子スタビリティ制御 サスペンションシステム 電子制御サスペンション ブレーキシステム ブレーキバイワイヤ/ABS (*) ステアリングシステム ステアバイワイヤ/パワーステアリング タイヤ/ホイール シャシ/コンポーネント 車間距離自動維持運転システム 車線維持支援システム 横滑り防止装置 二輪車/大型車両/特殊車両/航空機	electronic stability control suspension system electronically controlled brake system brake-by-wire/antilock brake system (ABS) steering system steer-by-wire/power steering tire/wheel chassis/component adaptive cruise control system lane-keeping assistance system electronic stability control motorcycle/heavy duty vehicle/special vehicle/aircraft	運動制御 車両動力学 評価技術 ドライバモデル 操縦安定性 力学モデル 道路環境認識 運転意図認識	motion control vehicle dynamics evaluation technology driver model driving stability dynamic model road environment recognition driver intention recognition
(B2)	⑤車両開発 vehicle development	プラットフォーム CAD/CAM/CAE (*) パーソナルモビリティ ホワイトボデー バンパ/ボデー外板 インストパネル シート/照明 デザイン HILS	platform computer-aided design (CAD)/computer aided manufacturing/computer aided engineering personal mobility body shell/white body/body in white bumper/body model instrument panel seat/lighting design hardware in the loop simulation	性能計画 エクステリア/インテリア カラー 車体構造/車体設計 構造部材解析 車両計画 軽量化 設計最適化/ロバスト設計 設計シミュレーション/設計ツール/設計モデリング 短期試作/仮想進行 車両用途 モータスポーツ 信頼性 負荷シミュレーション	performance plan exterior/interior color body structure/body design structural member analysis vehicle plan weight reduction design optimization/robust design design simulation/design tool/design modeling rapid prototyping/virtual planning vehicle application motor sports reliability load simulation
(B3)	⑥振動・騒音・乗り心地 vibration, noise, and ride comfort	パワートレイン/車体/エンジン 懸架系 吸排気システム/駆動系 サスペンションシステム ブレーキ/タイヤ 車体構造/車体材料 防音材 補機・デバイス騒音 アイドル振動騒音/加速時騒音 こもり音/振動 静粛性 ドラミング(低周波ロードノイズ) ロードノイズ/パターンノイズ パワートレイン揺動(始動/発進/変速) うなり音(パワートレイン/駆動系)	power train/body (vehicle body)/engine mounting system intake and exhaust system/drive line (drivetrain) suspension system (suspension) brake/tire body structure/body material acoustic material accessory and device noise idling vibration/idling noise/acceleration noise booming noise/vibration quietness drumming noise (low frequency road noise) road noise/pattern noise powertrain oscillation (powertrain start/vehicle start/shift) whine/growl/beat noise [powertrain/drive line (drivetrain)]	CAE解析/予測/最適化 (*) 有限要素法/境界要素法 評価技術/計測技術/音源探索技術 マルチボディダイナミクス 統計的エネルギー解析法 フルビークル解析 実験解析技術 最適化技術 音質評価/乗り心地評価 デバイス技術/制御技術 モード解析/伝達経路解析/流体騒音解析	CAE simulation/forecast/optimization finite element method (FEM)/boundary element method (BEM) evaluation technology/measurement technology/sound source search technology multi-body dynamics statistical energy analysis full-vehicle simulation test and analysis technology optimization technique sound quality evaluation/ride comfort evaluation device technology/control technology modal analysis/transfer path analysis/fluid induced noise analysis

		ギア音 乗り心地 ハーシュネス シミー 走行車体振動 風切り音 ブレーキ鳴き/ジャダー 車外騒音/騒音規制	gear noise ride comfort harshness shimmy body vibration while driving wind noise brake noise/judder exterior noise/noise regulation		
(C1)	⑦安全 safety	衝突安全/火災安全/予防安全/統合安全 安全教育 素材可燃性テスト 抑制システム 救命救急/乗員保護/歩行者・2輪乗員保護/交通弱者保護 事故回避/衝突予知 衝突試験 後方衝突/側方衝突/前方衝突 防火 プリクラッシュ コンパチビリティ ドライビングシミュレータ エアバッグ/シートベルト 人体モデル/ダミー ドライブレコーダ/EDR 車体構造 シート/ヘッドレストレイント 高齢者保護/子ども保護 CRS (*) 妊婦乗員保護 歩行者検知/保護 自動ブレーキ 被害軽減ブレーキ/警報 知能化自動車 ACC (*) 道路環境 交差点カメラ 傷害データベース 臨界安全システム シートベルトリマインダ 事故通報システム (ACN) ドクターヘリ/ドクターカー 免許制度 傷害基準 インパクト ヘルメット	passive safety (collision safety/crash safety)/fire safety/active safety/combined active and passive safety/integration control/integrated control safety education material flammability test suppression system first aid/occupant protection/pedestrian and bicycle and motorcycle rider protection/protection for vulnerable road users accident avoidance/collision prediction crash test rear end collision/side impact/frontal collision fire protection pre-crash compatibility driving simulator air bag/seat belt anthropomorphic dummy/crash test dummy drive recorder/event data recorder body structure seat/head restraint protection of older people/child protection child restraint system expectant mother protection pedestrian detection/protection automatic brake damage mitigation brake/warning intelligent vehicle adaptive cruise control road environment intersection camera injury database critical safety system seat belt reminder automatic crash notification/automatic collision notification doctor helicopter/doctor car licensing system injury criteria impactor helmet	道路環境認識 画像処理/情報処理 知能化/コンピュータ応用 乗員検知/乗員の安全 被害軽減 衝撃吸収・緩和 事故解析/事故統計解析 事故調査・分析 ヒヤリハット解析 救命率/初療開始 傷害予測 傷害メカニズム 事故再現/事故復元 安全人体モデル 車両転覆 センサ技術 高齢者耐性/高齢者運転特性 受傷部位/加害部位 重傷度 (AIS) 車両運動制御/エアバッグ制御 車線維持制御 ナビゲーション 車車間・路車間通信 運転支援/ドライバ支援 ISS (*) マクロデータ/マイクロデータ リスクカーブ 加害性 デルタV 回避行動 試験/評価 第三者評価 法規 CAE (*)	road environment recognition image processing/information processing intelligent/computer application occupant detection/occupant damage mitigation energy-absorbance and impact attenuation accident analysis/statistical accident analysis accident investigation and analysis near-miss analysis survival rate/start of initial injury prediction injury mechanism accident reconstruction/accident re-creation anthropomorphic dummy rollover sensor technology injury tolerance of older people/characteristics of older drivers injured area/impacting area abbreviated injury scale vehicle dynamics control/airbag control lane-keeping control navigation system vehicle-to-vehicle and infrastructure-to-vehicle communication driving support/driver support injury severity score macro data/micro data risk curve risk delta-v/change in velocity evasive action test/evaluation third-party evaluation regulation computer aided engineering
	⑧人間工学 human engineering	高齢者 人体傷害 バイオメカニクス 生体計測/運転心理 ドライバ状態 認知反応時間 居眠り/飲酒 タスク負荷	elderly person [people] human body injury biomechanics bioinstrumentation/ driving psychology driver condition cognitive reaction time drowsiness/alcohol drinking task load/driver burden	高齢者対応 実験倫理/技術倫理 ストレス/主観/パフォーマンス 評価 ドライバセンシング/ドライバモニタリング ドライバモデル/ライダーモデル ドライバ状態モニタリング ドライバ特性/ドライバ行動/ドライバ疲労/ドライバ注意 運転特性	elderly person [people] support experiment ethic/engineering ethic stress/subjective view/performance evaluation driver sensing /driver monitoring driver model/rider model driver condition monitoring driver characteristics/driver behavior/driver fatigue/driver attention driving characteristics

(C2)		<p>心拍測定 リスク補償</p> <p>過信/不信</p> <p>ヒューマンインタフェース</p> <p>車酔い/香り/覚醒 疲労/負担 ディストラクション ワークロード リスク認知</p> <p>ヒューマンエラー 感性/視覚/視認性 HMI (*) 警報システム 情報提供システム</p> <p>意図確定 運転能力</p> <p>ドライブレコーダ</p> <p>質問紙/インタビュー 運転行動 ユーザビリティ 温熱環境 ドライビングポジション メンタルモデル 顔表情</p>	<p>cardiotachometry risk compensation</p> <p>overconfidence/disaffection</p> <p>human interface</p> <p>car sickness/aroma/awakening fatigue/workload distraction workload risk recognition</p> <p>human error sensitivity/vision/visibility human machine interface warning system information systems</p> <p>intent determination driving ability</p> <p>drive recorder</p> <p>questionnaire/interview driving act/driver behavior usability thermal environment driving position mental model facial expression</p>	<p>ドライビングシミュレータ 視界/視認性/操作性/制御性/ 乗降性/快適性</p> <p>聴覚/力覚/触覚</p> <p>認知/判断</p> <p>操作 運転姿勢 個人差 精神負担/身体負担 脳・神経系/筋・骨格系</p> <p>生体計測/生体力学 運転支援 警報 生理計測 自律神経/中枢/内分泌</p> <p>視覚系/嗅覚系 形態・動態特性/感性・知覚特 性</p> <p>操作量/作業成績</p> <p>行動観察 精神・肉体疲労 HMI (*)</p>	<p>driving simulator field of vision/visibility/operability/control lablity/ ease of egress and ingress/comfort sense of hearing/sense of force/haptic sense</p> <p>recognition/judgment</p> <p>operation driving posture individuals difference/variation mental workload/physical cerebral nerve system/musculoskeletal system bioinstrumentation/biomechanics driving support/driver support alarm/warning physiological measurement automatic nervous system/central nervous system/endocrine visual system/olfactory system morphological and dynamic characteristics/perceptual and sensory characteristics operation amount/ operational performance behavior observation mental and physical fatigue human machine interface</p>
(D1)	<p>⑨熱・流体 heat・fluid</p>	<p>車体/エンジン/吸排気系/部品 要素 空力性能/空力騒音</p> <p>ラジエータ/オイルクーラ 油冷システム/空冷システム</p> <p>エアコンディショナ 冷媒 空気質/臭い</p>	<p>body/vehicle body/engine/intake and exhaust system/part element aerodynamic performance/aerodynamic noise radiator/oil cooler oil cooling system/air cooling system air conditioner refrigerant air quality/odor</p>	<p>CFD (*) 風洞試験 アルゴリズム/モデリング 車室内環境 エンジン冷却 空調/快適性 温度制御/環境制御 熱害</p>	<p>computational fluid dynamics wind tunnel test algorithm/modeling interior environment engine cooling air conditioning/comfort temperature control/environmental control heat damage</p>
(D2)	<p>⑩環境・エネルギー・資源 environment・energy・ resources</p>	<p>リサイクル リユース レアメタル/レアアース ISO14000 太陽光/風力 LCA (*) 大気環境/水質環境/土壌環境 排出ガス 燃費/熱効率 新エネルギー 再生可能エネルギー/リニュー アブルエネルギー 燃料/代替燃料 有害大気汚染物質 温暖化ガス VOC (*)</p>	<p>recycling reuse rare metal/rare earth ISO14000 sunlight/wind power life cycle assessment air quality/water quality/soil environment emissions/emission gas fuel economy/thermal efficiency new energy recyclable energy/renewable energy fuel/alternative fuel hazardous air pollutant heat-trapping gas/greenhouse gas volatile organic compound</p>	<p>環境重視型生産 環境指向型生産設計/リサイ クル設計 メンテナンス 基準 国際環境政策/政策分析 材料リサイクル ライフサイクル管理 設計/生産 高耐用技術 規制/政策/標識 健康影響 評価モード 国際基準調和 製造/使用/廃棄段階 エネルギー製造 気候変動</p>	<p>environmentally conscious production environment-oriented production design/recycle design maintenance standard international environmental policy/policy analysis material recycling life cycle management design/production long service life technology regulation/policy/marketing health effects evaluation mode global standard harmony manufacturing/use/disposal stage energy manufacturing climate change</p>
	<p>⑪材料 materials</p>	<p>鉄鋼材料 軟鋼板/高張力鋼板/表面処 理鋼板 ステンレス鋼 特殊鋼 鋳鉄 焼結材料/粉末合金</p>	<p>iron and steel materials low carbon steel sheet/mild steel sheet/high-strength steel sheet/surface treated steel sheet stainless steel special steel cast iron sintering material/powder alloy</p>	<p>試験/評価 モデリング 負荷シミュレーション 信頼性/ロバスト設計 防錆</p>	<p>test/evaluation modeling load simulation reliability/robust design rust prevention</p>

(D3)		非鉄材料 アルミニウム合金/マグネシウム合金/チタン合金 複合材料 高分子材料 エラストマ ポリマー複合材 SMC (*) プラスチックリサイクルング インストパネル バンパ/車体/外装 内装/シート 接着剤 塗料 エンジンコンポーネント シール/ガスケット 窓ガラス 構造用セラミクス/エレクトロセラミクス 二次電池材料/モータ用材料 電磁鋼板 電解質 永久磁石 触媒 グリース	non-ferrous material aluminum alloy/magnesium alloy/titanium alloy composite material polymer material elastomer polymer composite material surface mount chip or sheet molding compound plastic recycling instrument panel bumper/body/vehicle body/exterior interior/seat adhesive paint engine component seal/gasket window glass structural ceramics/electroceramics secondary battery material (rechargeable battery material)/material for motor magnetic steel sheet electrolyte permanent magnet catalyst grease	軽量化 強度/剛性/耐磨耗 疲労 耐食/電食 添加 熱処理/焼き入れ 表面処理/めっき 鋳造/鍛造 接合/結合/溶接 プレス技術 プロセス 精錬 加工性/リサイクル性 衝撃性/透明性 耐熱/耐油/耐燃料/耐水/耐光 平滑性 絶縁性能 ナノテクノロジー 破壊/酸化/劣化/耐熱性 磁気特性 フリクション	weight reduction/mass reduction strength/stiffness/rigidity/wear resistance fatigue anticorrosion/stray current corrosion/electrolytic corrosion addition heat treatment/quenching surface treatment/plating casting/forging joining/coupling/welding press technology/stamping technology process smelting workability/recyclability impact resistance/transparence heat resistance/oil resistance/ fuel resistance/water resistance/light resistance/light fastness smoothness insulation performance nanotechnology fracture/oxidation/deterioration/degradation/heat resistance magnetic characteristics friction
(D4)	⑫生産・製造 production・manufacture	素形材 成形加工 付加加工 チームワーク設計 量産試作 鋳造/鍛造/組立/塗装/艤装 生産計画/製造計画/生産管理/製造管理 品質管理/供給系管理/日程管理 金型 熱処理/表面処理 設備/保守/メンテナンス 調達/購買 一貫生産 PLM/BOM/PDM/MES (*)	formed and fabricated materials forming process additional machining teamwork design quantity production prototyping casting/forging/assembly/painting/rig/trim production plan/manufacturing plan/production management/manufacturing control quality control/supply control/schedule control/schedule management die/mold heat treatment/surface treatment equipment/maintenance/maintenance procurement/purchase continuous production product lifecycle management/bill of materials/product data management/manufacturing execution system	企画/意匠/サイマル 材料/コスト プレス/樹脂(プラスチック) 機械加工/高エネルギー密度加工 接合/溶接/肉盛り CAT/評価/品質 (*) 検査/測定 設計/試作 モジュール トータルコスト	planning/design/simulation material/cost press/resin (plastics) machining/high energy density machining joining/welding/weld overlay computer-aided testing /evaluation/quality inspection/measurement design/prototyping module total cost
	⑬エレクトロニクス及び制御 electronics and control	エンジン制御/トランスミッション制御/シャシー制御 衝突安全制御/予防安全制御/知能化安全制御 統合制御/車体系制御/バイワイヤ制御/EV・HEV制御 (*) 電子デバイス/パワーデバイス 車載マイコン/車載LSI (*) ECU/PCU (*) ミリ波レーダ/レーザレーダ/UWB (*) 半導体カメラ/赤外カメラ 表示デバイス/操作デバイス/警報・情報提供デバイス 車庫入れ支援システム LEDライト (*)	engine control/transmission control/chassis control passive safety control/active safety control/intelligent safety control integration control/vehicle body control/by-wire control/electric vehicle and hybrid electric vehicle control electronic device/power device microprocessor/large scale integrated circuit electronic control unit/ millimeter wave radar/laser radar/ultra wide band radar semiconductor camera/infrared camera device/operation device/warning and information device parking assist system light emitting diode light	試験/計測/診断 信頼性/シミュレーション 制御システム/ソフト データ転送・蓄積 ハードウェア・ソフトウェア標準化 テスト情報管理 電子物性 電気回路/電子回路 車両センサ/アクチュエータ 画像処理	test/measurement/diagnosis reliability/simulation control system/software data transfer and storage hardware and software standardization information management electronic properties electric circuit/electronic circuit vehicle sensor/actuator image processing

(E1)		フィジカルセンサ/ケミカルセンサ MEMS (*) ドライバ状態検知制御システム/セキュリティ制御システム 制御シミュレーション/HILS (*) エコカーエレクトロニクス HMI表示/HMI操作/HMI情報提供システム (*) 制御ナビゲーション 画像認識システム/音声認識システム 電動アクチュエータ EMC (EMI/EMS) (*) 車載多重通信システム 灯火系 EDR (*) OBD (*) ワイヤハーネス/電力系ワイヤハーネス ソフトウェアプラットフォーム ロボティクス 知的制御システム/自律走行システム 電力システム	physical sensor/chemical sensor micro electro mechanical systems driver state detection control system/security control system control simulation/hardware in the loop simulation environmentally friendly car electronics human machine interface display/human machine interface operation/human machine interface information provision system control navigation image recognition system/speech recognition system electrical actuator electromagnetic compatibility (electromagnetic interference/electromagnetic susceptibility) on-board multiplex communication system light event data recorder on-board diagnostics wiring harness/wire harness/electrical system wire harness software platform robotics control system/autonomous land system/autonomous driving electrical system	オンロードテスト/耐久テスト/部品レベルテスト 新計測法 知能化 システム工学 機能安全 電気機器 パッケージ/アセンブリ/実装技術	on-road test/duration test/durability test/parts level test new measuring technique intelligent system engineering functional safety electrical equipment package/assembly/packaging technology
(E2)	⑭情報・通信及び制御 information, communication, and control	CAN (*) AUTOSAR ブルートゥース V2G (*) PLC (*) 無線LAN ドライブレコーダ 車両ナビゲーション/コミュニケーションシステム FlexRay 車載高速通信 UWB通信 インタネット通信 スマートグリッド クラウドシステム リモートダイアグ LIN (*) インタナビ交通情報 HDラジオ (*) PND (*) ネットワークトレーサビリティ WiMax 電子すかし技術 セキュア通信プロトコル	controller area network AUTOSAR Bluetooth vehicle to grid power line communication wireless local area network drive recorder vehicle navigation system/communication system FlexRay high-speed communication ultra wide band communication Internet communication smart grid cloud system remote diagnostics local interconnect network traffic information HD Radio portable navigation device/personal navigation device network traceability Worldwide Interoperability for Microwave Access digital watermark technology secure communication protocol	車車間通信 情報システム オーディオ ナビゲーション 環境認識 通信システム 室内ネットワーク/車両ネットワーク IT/ITS (*) メディア情報 エコドライブ 音声認識 光通信 WEBコンテンツ 分散処理システム マルチコアCPU オペレーションシステム	inter-vehicle communication/vehicle-to-vehicle communication information system audio navigation system environment recognition communication system interior network/vehicle network information technology/intelligent transport system media information eco-drive/environmentally friendly driving speech recognition optical communication web contents distributed processing system multi-core CPU operating system
(F1)	⑮社会システム social system	省エネ運転 電気社会システム	energy-saving driving electricity-based society systems	交通環境 交通工学 交通流 安全教育 道路	traffic environment traffic engineering traffic stream safety education road
	⑯共通基盤 common infrastructure	オンボード計測 耐久テスト テスト情報管理 部品レベルテスト CAD/CAM/CAE (*)	onboard measurement durability test information management parts level test computer-aided design/computer aided manufacturing/computer aided engineering	模型実験 シミュレーション/モデリング 設計 保守/整備/保全 サービス 短期試作	experiment with a model simulation/modeling design maintenance/maintenance/protection service rapid prototyping

(F2)				仮想進行 修理 診断装置 保証 モニタリング データ転送・蓄積 規格/規制 法規/認証 品質保証 政策提案 知財 技術者教育/育成 自動車技術史	virtual planning repair diagnostic device warranty monitoring data transfer and storage standard/regulation regulation/certification quality assurance policy proposal intellectual property engineering education/training history of automotive technology
(F3)	①その他のモビリティ other means of mobility	航空機 アビオニクス 海洋/船舶 航空宇宙 鉄道 パーソナルモビリティ	airplane avionics marine/shipping aerospace rail personal mobility		

#	略語 Abbreviation	英語 English	日本語 Japanese
1	ABS	Antilock Brake System	アンチロックブレーキシステム
2	ACC	Adaptive Cruise Control	車間距離制御システム
3	AMT	Automated Manual Transmission	自動化マニュアルトランスミッション
4	AWD	All Wheel Drive	全輪駆動(4輪駆動)
5	BDF	Bio Diesel Fuel	バイオディーゼルフューエル
6	BOM	Bills of Materials	部品表
7	CAD	Computer Aided Design	コンピュータ支援設計
8	CAE	Computer Aided Engineering	コンピュータ支援技術
9	CAM	Computer Aided Manufacturing	コンピュータ支援加工
10	CAN	Controller Area Network	コントローラエリアネットワーク
11	CAT	Computer Aided Testing	コンピュータ支援検査
12	CFD	Computational Fluid Dynamics	数値流体力学
13	CRS	Child Restraint System	幼児拘束装置
14	CVT	Continuously Variable Transmission	無段変速機
15	DCT	Dual Clutch Transmission	デュアルクラッチトランスミッション
16	DME	Dimethyl Ether	ジメチルエーテル
17	ECU	Electronic Control Unit	エンジン制御コンピュータ
18	EDR	Event Data Recorder	イベントレコーダ
19	EMC	Electromagnetic Compatibility	電磁妨害感受性
20	EMI	Electromagnetic Interference	電波障害
21	EMS	Electromagnetic Susceptibility	電磁的免疫性
22	EV	Electric Vehicle	電気自動車
23	FT	Fischer Tropsch	フィッシャートロプシュ
24	HD	High Definition	ハイデフィニション
25	HEV	Hybrid Electric Vehicle	ハイブリッドカー
26	HILS	Hardware In the Loop Simulation	HILシミュレーション
27	HMI	Human Machine Interface	ヒューマンマシンインタフェース
28	ISS	Injury Severity Score	傷害度スコア
29	IT	Information Technology	情報技術
30	ITS	Intelligent Transport System	高度道路交通システム
31	LCA	Life Cycle Assessment	ライフサイクルアセスメント
32	LED	Light Emitting Diode	発光ダイオード
33	LIN	Local Interconnect Network	ローカルインタコネクトネットワーク
34	LSI	Large Scale Integration Circuit	大規模集積回路
35	MEMS	Micro Electro Mechanical Systems	メムス
36	MES	Manufacturing Execution System	製造実行システム
37	OBD	On Board Diagnosis	車載診断
38	PCU	Power Control Unit	パワーコントロールユニット
39	PDM	Product Data Management	製品情報管理
40	PLC	Power Line Communications	電力線搬送通信
41	PLM	Product Lifecycle Management	製品ライフサイクル管理
42	PND	Portable Navigation Device	可搬型ナビゲーション装置
43	SCR	Selective Catalytic Reduction	選択触媒還元
44	SMC	Sheet Molding Compound	シートモールディングコンパウンド
45	SOC	State Of Charge	充電レベル
46	UWB	Ultra Wide Band Radar	超広帯域無線
47	V2G	Vehicle to Grid	ビークルトゥグリッド
48	VOC	Volatile Organic Compounds	揮発性有機化合物