



Public Solicitation for Advanced Digital Technology Information on Fire Administration and Ideas for Its Use 2023

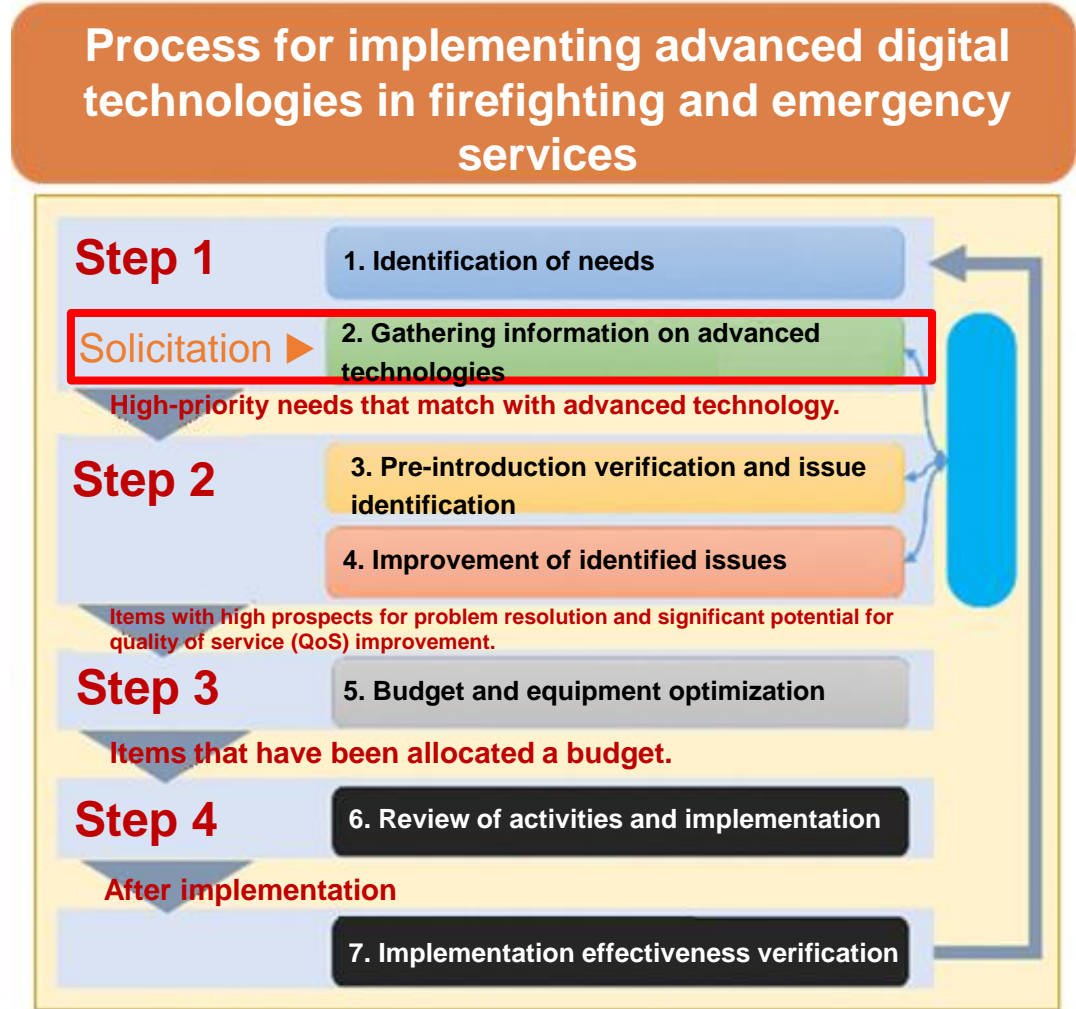
Application Guidelines

Tokyo Fire Department

1. Outline of Public Solicitation

The Tokyo Fire Department (hereafter referred to as the “TFD”) aims to improve administrative services by implementing advanced digital technologies in firefighting and emergency response activities to enhance the safety, reliability, and speed of firefighting and emergency response activities and improve operational efficiency.

This public solicitation aims to match the TFD’s issues and on-site needs with information and ideas for using advanced digital technologies held by the private sector.



Using this process as a foundation, we will implement more advanced digital technologies to enhance the efficiency of our field activities.

2. Application Requirements

A **private company** that meets the following 1 and 2 is eligible.

1. The applicant must **possess technologies or related abilities pertinent to the theme of the public solicitation.**
2. The applicant must **agree to the following considerations.**
 - (1) The implementation of this public solicitation **does not guarantee the execution of any project in the future.**
 - (2) Neither the presence nor the content of any application to this public solicitation **will impact TFD's selection of companies for future projects.**
 - (3) **The applicant shall bear all costs** associated with this public solicitation.
 - (4) **The materials provided by the applicant in relation to this public solicitation may be shared with the Fire and Disaster Management Agency of the Ministry of Internal Affairs and Communications or other fire departments.** In such cases, no information the applicant does not wish to share will be provided without the applicant's consent.
 - (5) Materials and other information provided by the applicant in connection with this public solicitation are, with some exceptions, **subject to disclosure requests** in accordance with the Tokyo Metropolitan Government's Information Disclosure Ordinance (Tokyo Metropolitan Ordinance No. 5, 1999).
 - (6) If **the information obtained from the TFD** through this public solicitation contains information not generally available to the public, **please handle it strictly and appropriately** in compliance with relevant laws and regulations.
 - (7) Should any questions arise regarding these application requirements, they should be resolved through mutual consultation between the two parties.

3. Submission Method and Deadline



Applicant Company



TFD

① Submission of the Letter of Intention to Provide Information

- Companies willing to provide information on the public solicitation themes are requested to fill out the attached Statement of Intention to Provide Information form and submit it via **email** to the designated contact person **by Thursday, November 16, 2023.**

② Providing information on advanced technologies

- Please email the materials providing information on the public solicitation theme to the designated contact person **no later than Thursday, December 28, 2023.**

Delivery of the Information Request Form

- After confirming that the application requirements have been met, the TFD will issue your company an Information Request Form.



4. Contact Information

■ Application Form

Statement of Intention to Provide Information

<https://www.tfd.metro.tokyo.lg.jp/hp-kikakuka/koubo/jouhou/data/satatement-for1-9.docx>

Statement of Intention to Provide Information (for free themes only)

<https://www.tfd.metro.tokyo.lg.jp/hp-kikakuka/koubo/jouhou/data/satatement-for10freetheme.docx>

■ Contact

Personnel in charge of Digital Strategy, Planning Section, Planning and Coordination Division, Tokyo Fire Department

Email address: kikakuka14@tfd.metro.tokyo.jp

Official website (page dedicated to public solicitation)

<https://www.tfd.metro.tokyo.lg.jp/hp-kikakuka/koubo/jouhou/>

5. List of Themes for Public Solicitation

We invite submissions of information on advanced digital technologies and ideas for their utilization pertaining to the following themes.

For more details on each theme's background and envisioned future, please refer to "6. Details of public solicitation themes."

No.	Public solicitation theme	Keyword
1	Information on wearable devices that can measure information (vital signs, psychological status, location, etc.) of individual team members during activities	#Team member's information (vital signs, psychological status, location, etc.) #Wearable devices
2	Technical information on acquiring the latest location information of people in distress in mountainous areas	#Mountain distress #Location awareness #Various mountaineering GPS apps
3	Information on products and technologies that support the intuitive perception of ambient temperature during firefighting activities at fire scenes	#Fire scene #Ambient temperature awareness #Intuitive awareness of temperature (direction, etc., is also sensed by vibration, etc.)
4	Technical information aimed at reducing the time spent on field surveys related to musical band performance	#VR #AR #Field survey on virtual space #Setting a venue in a virtual space
5	Technical information for enhancing the efficiency and utilization of information management in emergency activities	#AI automated document creation for text-to-speech information #AI automated document creation
6	Technical information aimed at promoting timely and appropriate attendance management through real-time monitoring of emergency services activity time	#Attendance management system
7	Technical information aimed at further enhancing the efficiency and satisfaction of metropolitan residents through the use of AI technology in Emergency Counseling Centers	#Speech recognition #Natural language processing #Chatbots #Predictive and real-time analysis
8	Information on innovative firefighting vehicles realized through "EV x DX"	#Firefighting vehicles #Electric pump truck #Connected cars #Hybrid pump truck
9	Technical information on implementing operational training for pump trucks utilizing VR technology and more	#Pump operation training #VR related software #VR head-mounted display #CG technology
10	Free theme (Corporate-proposal type)	#Free theme #Proposal type #Introduction of technological seeds

6. Details of Public solicitation themes

Public solicitation theme	Information on wearable devices that can measure information (vital signs, psychological status, location, etc.) of individual team members during activities
Current situation and background	<p>It remains unclear how the mental and physical states of firefighters change when they encounter flames, lose vision due to black smoke, or feel heat at a fire scene and how these states impact their firefighting capabilities. Furthermore, there is no method available to ascertain the location information of personnel operating inside burning buildings, structures with complicated interiors due to earthquakes or collapsed loads, vast factory premises with spills of toxic or hazardous materials, landslide sites, and the like.</p>
Future vision to be realized	<p>Quantifying and accumulating data on the impact of firefighters' mental and physical conditions on their ability to perform firefighting activities can be used to help set thresholds of vital data (e.g., upper heart rate, etc.) for firefighters' safety. Furthermore, the location information of the team members can be ascertained by wearable devices, etc.</p>
Examples of assumed technologies	<p>Wearable devices that can measure vital data such as brain waves and heart rate and provide indoor and outdoor positioning through a wristwatch, headband, earphones, or T-shirt (clothing)</p>

6. Details of Public Solicitation Themes

Public solicitation theme	Technical information on grasping the latest location information of persons in distress in the mountains
Current situation and background	<p>The number of accidents in the mountains in Tokyo has been increasing steadily, and last year, it was the second highest in Japan. As the population of mountain climbers ages, there is an urgent need for rescue measures in the easily accessible mountainous areas of Tokyo, which are close to densely populated regions.</p>
Future vision to be realized	<p>The majority of today's climbers utilize smartphones and other mountaineering applications, and mountaineering application providers often have up-to-date location information on people in distress. Mountain rescue begins by establishing contact with the person in distress. However, if their location in the mountainous terrain is unknown, the rescue operation can be prolonged. Therefore, by obtaining the location information of the person in distress and the searcher from the mountain climbing application providers, it is expected that the Fire Department will be able to promote efficient distress rescue.</p>
Examples of assumed technologies	<p>Various GPS applications for mountaineering</p>

6. Details of Public Solicitation Themes

Public solicitation theme	Information on products and technologies that assist in the intuitive perception of ambient temperature during firefighting activities at the scene of a fire
Current situation and background	<p>In recent years, in order to ensure the safety of firefighters working at disaster sites, there have been several attempts to introduce state-of-the-art equipment for early detection of hazards at the scene. However, the newest equipment is expensive and requires a great deal of skill to use. What is more desirable, then, is for individual members of the team to be able to perceive information on danger about their surroundings intuitively. Research has shown that if ambient sound and light information is converted into tactile information such as vibrations, etc., and the vibrations, etc., are given to people, they will eventually be able to intuitively perceive ambient information from the vibrations, etc., obtained. By utilizing the results of the above studies and others, we believe that an approach that enables individuals to perceive risk factors in the field more intuitively is well worth attempting.</p>
Future vision to be realized	<p>By equipping each team member with a vest or a similar device that measures ambient temperature and converts the data into tactile information like vibrations, the team can intuitively perceive changes in temperature and its direction, even when fully dressed at the scene of a fire. This approach will inevitably lead to the quicker detection of flashover hazards and identification of the fire's origin, contributing to improved safety for personnel on duty and expedited fire suppression.</p> <p><small>*Flashover: Rapid expansion from relatively small-scale burning in the early stages (of a fire) to burning over an entire parcel. (Theory and Application of Fire and Fire Fighting, p.138, Tokyo Horei Publishing Co., Ltd., 2005, supervised by the Japan Association for Fire Science and Engineering)</small></p>
Examples of assumed technologies	<p>Technology and ideas to measure environmental temperature with small temperature sensors that can be installed in fire suits, fire hats, etc., convert the measured information into tactile information such as vibration and transmit it to the wearer through the medium of a vest or wrist band.</p> <p>Similar product development and research are underway overseas, including vests and wristbands that convert ambient sound into tactile information and transmit it to the wearer to assist in sensing the content and direction of conversations.</p>

6. Details of Public Solicitation Themes

Public solicitation theme	Technical information for reducing field survey time for musical band performance work
Current situation and background	<p>The basic rule of thumb for field surveys related to music band performance work is to go to the site and conduct the survey. However, it is not easy to coordinate time during busy periods. We have to rely on map information available on the Internet (e.g., Google Maps) and telephone advice from fire department personnel who operate large vehicles in the area under their jurisdiction.</p>
Future vision to be realized	<p>Without having to go to the site, the system uses AR and VR,</p> <ul style="list-style-type: none">• Then reproduces roads (general roads and highways) and those around the concert venue (and, if possible, the parking lot of the concert venue) in virtual reality, allowing visitors to check how to get off highways onto general roads and the flow lines of large vehicles (buses and trucks) around the venue. Furthermore, the system allows for a virtual driving experience, reducing the burden on personnel operating the vehicles.• In a virtual reality reproduction of a performance venue, it should be possible to place instruments in the performance venue, rearrange instruments during a performance, and rehearse concert performances, including the Tokyo Fire Department (TFD) Color Guard, etc. In addition, the system should be able to hold pre-concert meetings in a virtual reality environment that replicates the performance venue.
Examples of assumed technologies	<p>Technology that uses AR and VR to match the 3D maps published by map companies (e.g., ZENRIN) with the flow lines of large vehicles and concert settings.</p>

6. Details of Public solicitation themes

Public solicitation theme	Technical information for more efficient information management and utilization in emergency activities
Current situation and background	<ul style="list-style-type: none">• Vital signs and other information on injured and sick persons in emergency activities are collected by handwritten notes.• When requesting a medical institution to accommodate a patient, the patient calls the medical institution and verbally communicates the contents of the note each time. (Increasing the number of calls to medical facilities increases activity time and the number of transmissions.)• The emergency care record and the emergency activity record sheet are entered into the system based on the notes after the case is completed. (Increased administrative and paperwork time.)
Future vision to be realized	<ul style="list-style-type: none">• The system converts handwritten notes into text based on voice and manages information.• Information that can be measured by machines, such as blood pressure and pulse rate, is automatically collected through means such as Bluetooth.• Medical institutions can share information on the injured and sick collected by the EMS team to determine whether or not to respond to a request without receiving a verbal message (note that this is not a solution to transport difficulties, as it is the human at the medical institution that decides whether or not to accept the patient).• AI creates emergency activity record sheets, etc., based on collected information.
Examples of assumed technologies	<ul style="list-style-type: none">• Converting audio information to text• Automatic document creation by AI

6. Details of Public Solicitation Themes

Public solicitation theme	Technical information for the promotion of timely and appropriate attendance management by real-time monitoring of the activity time of emergency services
Current situation and background	<ul style="list-style-type: none">The actual status of emergency activities is determined based on AVM* information entered by each unit, emergency activity recording systems, etc. <p>*AVM: Automatic Vehicle Monitoring (Records the time and status of the unit's activities by entering the time of arrival, departure, and return to the station, etc.)</p> <ul style="list-style-type: none">In the current system, real-time tracking of cumulative activity hours during duty is challenging, and duty managers rely on analog methods, such as reports from each unit. (Time and effort are required to determine cumulative activity hours, etc.)Difficulty in managing attendance in a timely and appropriate manner for each unit's excessive workload
Future vision to be realized	<ul style="list-style-type: none">Utilizing a system that enables real-time monitoring of emergency team activities promotes timely and appropriate attendance management through shift crewmembers. (Promotion of appropriate management of the person in charge of the duty by visualizing the activities and time of the emergency team)
Examples of assumed technologies	<ul style="list-style-type: none">Attendance management systems used in the transportation industry, etc. (including other specific proposals based on advanced technology).

6. Details of Public Solicitation Themes

Public solicitation theme	Technical information for further improving the efficiency and metropolitan resident satisfaction of Emergency Counseling Centers using AI technology
Current situation and background	<p>Each emergency consultation nurse manages around 400 emergency phone consultations monthly, entering the content and results of each call into their PC after completion. As the demand for emergency consultation increases each year, the accumulation of workload is inevitable, and input time is highly dependent on individual competence, resulting in disparities among nurses. Consequently, delays in input time have led to a stagnation in consultation reception and a decline in services for Tokyo residents. Furthermore, there are strong individual differences in emotion, hospitality, and speaking skills when answering the phone, making it extremely difficult for emergency consultation centers to seek a level playing field in terms of competence. Additionally, while the outsourcing of some nursing roles commenced this year, advanced data analysis and calculations are necessary to determine and allocate the requisite personnel for the growing volume of incoming calls annually.</p>
Future vision to be realized	<p>Information about medical institutions should be delivered autonomously using automated voice guidance and chatbot technology. The emergency consultation system reduces processing time by automatically converting the audio heard into text and reflecting it in the PC input. At the same time, natural language processing technology analyzes the text data to generate appropriate responses and assist in judging the level of urgency and preventing complaints. Moreover, by analyzing call data in real time, real-time analysis technology enhances communication with city residents, assesses their emotions and satisfaction levels, and guides nurses in taking appropriate action. In addition, predictive analytics technology will be used to forecast future trends and demand for emergency consultation centers and optimize staffing and resources based on forecasts.</p>
Examples of assumed technologies	<p>(1) Speech recognition technology (Google’s Speech To Text and IBM Watson’s Speech to Text) and (2) Natural language processing technology (BERT and GPT series), i.e., technology that analyzes text data and understands the meaning of the words and phrases of TMG residents, generates appropriate responses to their inquiries and are used to generate responses and analyze trends from past data. (3) Chatbot technology (Microsoft’s Azure Bot Service and Facebook’s Messenger Platform) and (4) Predictive and real-time analysis technology, i.e., technology that analyzes call data and metropolitan data to determine future trends, demand, metropolitan sentiment, and satisfaction. In addition, a wide range of measures utilizing AI and other advanced technologies will be solicited for the #7119 Emergency Telephone Consultation Center in the TFD.</p>

6. Details of Public Solicitation Themes

Public solicitation theme	Information on advanced firefighting vehicles made possible by EV x DX
Current situation and background	<p>The trend towards Zero-Emission Vehicles (ZEVs) is progressing due to global regulations for decarbonization and gasoline-free initiatives to combat global warming, as well as the targets set by the government of Japan and the Tokyo Metropolitan Government for non-gasoline vehicles. The Tokyo Fire Department (TFD) has been converting some passenger cars and truck chassis to ZEVs in response to technological trends. However, it is still in the information-gathering and study phase for converting energy-intensive pump trucks to ZEVs.</p>
Future vision to be realized	<p>The conversion of firefighting vehicles to ZEVs contributes to the reduction of greenhouse gas emissions and fuel costs, as well as to the realization of smart firefighting activities through quieter operation, which facilitates communication among crews and improves safety management in the field.</p> <p>Furthermore, EVs, unlike internal combustion engine vehicles, have a simpler structure and greater emphasis on software, making them more compatible with Digital Transformation (DX) and facilitating the introduction and updating of safety technologies such as driving safety support systems and vehicle management technologies like operation management information and remote vehicle diagnostics. In addition, it will be possible to collect pump information, such as the amount of water discharged, which enables the energy saving of vehicles, more efficient operation of pump trucks, and simplification of paperwork, etc.</p>
Examples of assumed technologies	<ul style="list-style-type: none">• Electric pump truck• Hybrid pump truck• Connected car

6. Details of Public Solicitation Themes

Public solicitation theme	Technical information on the realization of operational training for pump trucks using VR technology, etc.
Current situation and background	<p>Since the pumping system itself is enclosed by the body of the vehicle, there are limited opportunities to view its structure and the flow of water within the pump and pump piping. Consequently, many malfunctions and delays in water discharge have been observed, stemming from operations conducted with an inadequate understanding of the conditions within the pump piping.</p>
Future vision to be realized	<p>Introducing content that visualizes the flow of water in the pump piping generated by pump operation using VR technology, etc., to enhance the understanding of pump truck operations. Practical understanding will be enhanced by experiencing various operational scenarios, such as the coordinated operation of two pump trucks, operation of a single pump truck with a water tank (use of the truck's water tank, use of fire hydrants (for pressurized water use) and use of fire prevention tanks (for non-pressurized water use), use of small volume foam mixing equipment, etc.</p> <p>In addition, by providing training content for situations that are rare to experience, such as responding to various types of problems and the reactions of various instruments in such cases, the practical skills of agency personnel are enhanced.</p>
Examples of assumed technologies	<ul style="list-style-type: none">• VR head-mounted display• VR-related software• CG technology

6. Details of Public Solicitation Themes

Public solicitation theme	Free theme (company-proposing theme)
Current situation and background	<p>A free theme (company-proposing type theme) was established as an opportunity for private companies to propose ideas for the utilization of their cutting-edge digital technologies in the fire service administration to solve fire service administrative issues in areas other than the public solicitation for proposals 1 through 9.</p>
Future vision to be realized	<p>The goal is to elevate the quality of firefighting administrative services by incorporating advanced digital technologies in firefighting and emergency services, thereby enhancing their safety, reliability, and responsiveness and increasing the efficiency of administrative operations within the TFD.</p>
Examples of assumed technologies	<p>Advanced digital technologies, etc., owned by the applicant companies</p>