

科学技術

Science and technology

今日の課題を解決し

先進の科学技術で被害の軽減を図り、現場

For resolving today's problems, avoiding tomorrow's risks

Using advanced science and technology in an attempt to reduce damage, and implementing

消防防災における科学技術の研究開発

Research and development of science and technology for fire and disaster prevention

消防研究センターでは、火災をはじめ各種災害による被害の軽減に資する研究を行っている総合的研究機関です。一線で活躍する消防職団員の活動を科学技術の面から支え、社会の安心・安全の要請に応えています。

また、大規模地震等の災害発生時には現場での支援活動に従事し、大規模・特殊な様態の火災、危険物流出等事故に係る原因調査を行い、それを踏まえた効果的な対策や消防活動の研究開発を進め、成果を最前線の活動に反映させています。

研究開発は、過密都市空間や化学物質、危険物施設に係る安全性向上、また大規模自然災害や特殊災害に対する消防防災活動等の領域に重点化し、消防本部と連携した消防の高度化、現場活動への科学技術成果の導入を進めています。

The National Research Institute of Fire and Disaster is a general research organization conducting research that may lead to a reduction in damage due to fires and other types of disasters. The Institute supports firefighting personnel working at disaster sites from a science and technology perspective, and responds to safety and security demands of society.

Personnel from the Institute participate in support activities in disaster stricken areas following a major earthquake to

investigate the causes behind large-scale and special disasters and spillage of dangerous materials. The results are used to create effective countermeasures, advance research and development of firefighting activities, and are applied directly to activities used to combat disasters.

Research and development focuses on improving safety in overpopulated cities, and facilities that handle chemical substances and dangerous materials, as well as fire and disaster prevention activities for combating major disasters and special disasters. This results in more sophisticated firefighting techniques in collaboration with fire defense headquarters, and the results of science and technology being applied to activities in disaster areas.



消防用防火服の耐火性実験

Testing fire resistance of fire-proof clothing used for firefighting



火災原因調査等への対応

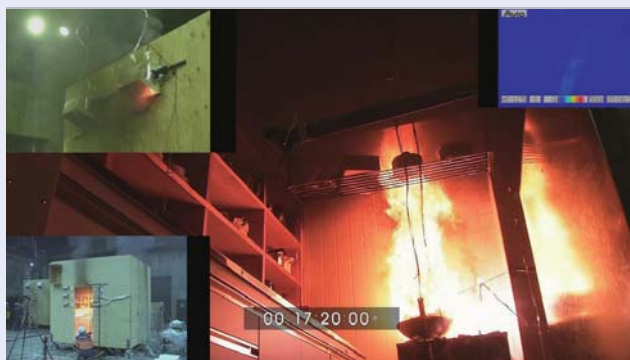
Response to investigations into causes of fires

消防研究センターは、消防庁が実施する原因調査を実際に行う組織でもあります。自ら原因調査を実施するだけでなく、鑑識・鑑定など消防本部が行う原因調査の支援も行っています。

さらに、原因調査の高度化に必要な研究の実施と、原因調査資機材の整備を行っています。

The National Research Institute of Fire and Disaster is actually the organization that conducts investigations into causes of fires carried out by the FDMA. In addition to conducting its own investigations into causes of fires, the organization provides support for investigations into causes of fires conducted fire defense headquarters in the form of identification and analyses.

Research required for sophisticated investigations into causes of fires is also conducted, and a full range of equipment used for these investigations is available.



火災の現場を再現し、状況を分析するための実大実験

Life-size experiment reenacting a fire to analyze various conditions



化学工場爆発火災の現地調査

Site-survey of explosion and fire at a chemical plant



電子顕微鏡、デジタル顕微鏡、X線透過装置を用いた分析の様子

Analysis conducted using an electron microscope, digital microscope and X-ray permeation device

、明日のリスクを回避するために での活動を支援する研究開発の実施

research and development to support activities in disaster locations

消防防災科学技術研究推進制度

Promotion Program for Scientific Fire and Disaster Prevention Technologies

消防防災の分野に先進の科学技術を積極的に導入活用していくため、消防防災に関わる競争的研究資金制度である「消防防災科学技術研究推進制度」を平成 15 年度に創設しました。

民間企業、大学などの研究機関から幅広く研究課題を募り、優秀な提案に対して資金提供を行い、より革新的な技術として実用化する取り組みを行っています。

消防防災科学技術研究推進制度：

民間企業等より提案された研究課題に対し、消防庁が研究費を委託する制度

The “Promotion Program for Scientific Fire and Disaster Prevention Technologies” competitive research funding program was established in 2003 as a method for actively introducing and applying advanced science and technology in the field of fire and disaster prevention.

A wide range of research topics are collected from research organizations such as private companies and universities, with funding provided to the most outstanding suggestions. In this way, groundbreaking technologies can be used in a practical way.

Promotion Program for Scientific Fire and Disaster Prevention Technologies: A program funded by the FDMA for research topics proposed by the private sector



競争的研究資金制度を活用し、産官の共同研究により開発された「水/空気 2 流体混合噴霧消火システム」とその消火実験
“Air/Water dual fluid mixture spray fire extinguishing system” developed through joint research with industrial-government collaboration using the competitive research funding program, and firefighting experiments using the system

新エネルギー・新技術等への対応

Response to new energy sources and new technologies

科学技術の進展により、これまで存在していなかった新たな技術や素材が誕生しています。これらの危険性の把握や適正な取り扱いなど、その安全対策が急がれています。

消防研究センターでは、バイオマス燃料（動植物から生まれた再生可能な有機性資源）や RDF（ゴミ固化燃料）の危険性の解明など、「安全で持続可能な社会」の実現に向けた研究を進めています。また消防庁においても、これらの研究成果などを踏まえ、必要に応じた技術基準の見直しなど、安全性を確保するための施策を推進しています。

With the advancement of science and technology, a number of new technologies and materials have been created that did not exist before. Safety policies for these are required urgently to gain a better understanding of their danger, and how to handle them properly.

The National Research Institute of Fire and Disaster has conducted research to identify the hazards of biomass fuels (renewable organic resources obtained from plants and animals) and RDF (refuse-derived fuel) in an attempt to create a safe and sustainable society. The FDMA has also used these research results to establish safety countermeasures, such as conducting reviews of technical standards where required.



平成 15 年 三重県のゴミ固化燃料 (RDF) 発電所で発生した RDF 貯蓄槽の爆発事故
2003 RDF storage tank explosion at an RDF power plant in Mie Prefecture



平成 17 年 福島県グリニャール試薬合成工場の爆発火災
(グリニャール試薬：化学物質を生成する際に使用する有機マグネシウムハロゲン化合物である)
2005 Explosion at Grignard reagent synthesizing plant in Fukui Prefecture (Grignard reagent: organic magnesium halides used when generating chemical compounds)

消防防災ロボットの開発

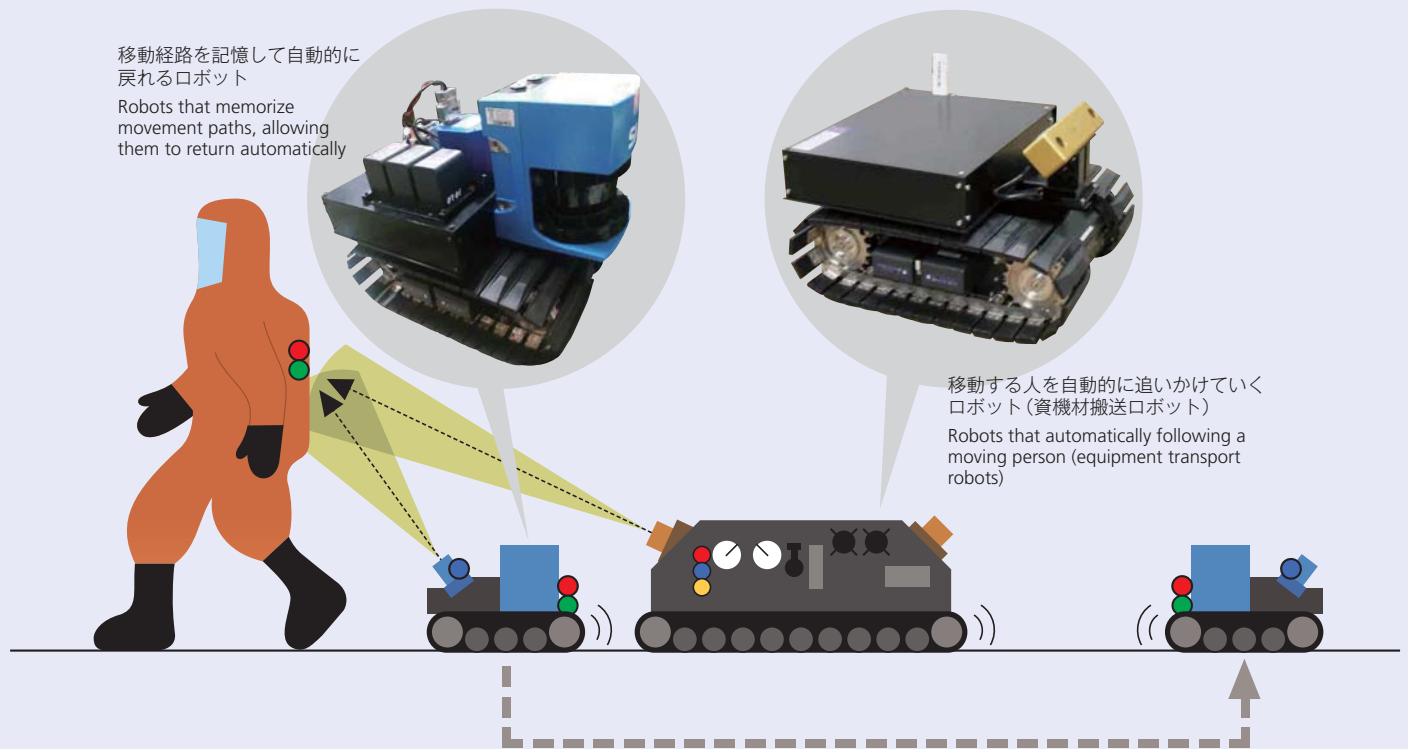
Development of fire and disaster prevention robots

原子力施設での火災や、テロによる有毒ガスの放出時のような消防隊員が進入困難な環境下において、情報収集・救助活動などの消防活動を支援するロボットの開発研究を行っています。

将来の実用配備に向けて、消防活動の現場で使用可能な、防水、防塵、耐衝撃性を備えた耐環境性の高い改良を行い、消防本部に試験的に導入されています。

The organization conducts developmental research on robots that assist with firefighting activities, such as information collection and rescue efforts, in areas where firefighting personnel find it difficult to enter, including fires at nuclear power plants and areas affected by the release of toxic gases due to terrorism.

Extreme environmentally-resistant modifications, including waterproofing, dustproofing and shock resistant capabilities that allow the robot to be used directly at the scene of fires, have been made, and robots are being introduced in experimental programs for practical deployment in the future



可燃性ガス・有毒ガス等を検出して危険を知らせるロボット
Robot that detects and notifies of flammable and toxic gases



防水・防塵・耐衝撃性を備えた実用化製品
Commercial product that is waterproof, dustproof and shock resistant