

## Mid to Long-term Objectives Comparative Table of National R&D Agency, Japan Agency for Marine-Earth Science and Technology (Draft)

(Competent ministry: Ministry of Education, Culture, Sports, Science and Technology)

Next mid to long-term objectives (Draft)	Current mid to long-term objectives
<p>In accordance with the provisions of paragraph (1) of Article 35-4 of the Act on General Rules for Incorporated Administrative Agencies (Act No. 103 of 1999), objectives concerning the administration of operations (hereinafter referred to as the “mid to long-term objectives”) to be achieved by national research and development agency Japan Agency for Marine-Earth Science and Technology (hereinafter referred to as the “Agency”) are set.</p> <p><b>I Position and role of the Agency in the policy system</b></p> <p>The Agency aims to enhance marine science and technology standards and make contribution to the development of academic research by conducting fundamental R&amp;D on the oceans and cooperating for academic research on the oceans in a comprehensive manner based on the principles of peace and welfare.</p> <p>In the 5th Science and Technology Basic Plan (decided by the Cabinet on January 22, 2016), marine science and technology is considered as part of science and technology which will produce great values critical for national strategy. In the 3rd Basic Plan on Ocean Policy (decided by the Cabinet on May 15, 2018), enhancement of scientific knowledge is always considered as one of the Agency’s major initiatives to be implemented, and therefore, efforts for ensuring full maritime security, including the establishment of a Maritime Domain Awareness (MDA) system, and provisions for promoting Japan’s Arctic Policy were newly added to its</p>	<p><b>Introduction</b></p> <p>In accordance with the provisions of paragraph (1) of Article 29 of the Act on General Rules for Incorporated Administrative Agencies (Act No. 103 of 1999), objectives concerning the administration of operations (hereinafter referred to as the “mid to long-term objectives”) to be achieved by Incorporated Administrative Agency Japan Agency for Marine-Earth Science and Technology (hereinafter referred to as the “Agency”) are set.</p> <p><b>Preface</b></p> <p>Ocean development and utilization is a socioeconomic base for our country, which is surrounded on all sides by wide expanses of ocean, and, therefore, conservation of marine environment including maintaining diversity of marine life should be the basis for the existence of human beings. While the expectation of developing marine resources is increasing in recent years, the Great East Japan Earthquake has also taught us of the existence of serious threats posed by ocean trench earthquake and tsunami disasters. Taking countermeasures against accelerating global environmental change, such as global warming still remains as an urgent issue.</p> <p>Under such circumstances, the critical role of the Agency in charge of promoting fundamental marine research and development is to provide with the most globally advanced research and development infrastructure. The Agency as a core institution</p>

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<p>working agenda. In particular, R&amp;D is essential for achieving the goal of Society 5.0 even in the field of oceanographic science, for instance, by creating new values using artificial intelligence (AI) and obtaining the capacity for big data analysis by developing the relevant technology based on an enormous amount of oceanographic information collected in oceanographic survey and observation system and utilizing the results for economic development and solutions to social issues.</p> <p>With regard to international situations, the control, conservation and sustainable use of the oceans and marine resources were included in the Sustainable Development Goals (SDGs) (UN Sustainable Development Summit in September 2015), in the G7 Ise-Shima Leaders' Declaration (May 2016), in the communiqué of G7 Science and Technology Ministers' Meeting in Tsukuba (May 2016), and in Decade of Ocean Science for Sustainable Development (2021-2030) (proclaimed at the 72nd UN General Assembly in December 2017). This indicates that the importance of the oceans has become a common understanding both in Japan and abroad. In consideration of the importance of Arctic region in international society, the Arctic Science Ministerial has been held every year since 2016, and the 3rd ministerial meeting in 2020 is scheduled to be held in Japan.</p> <p>Under these circumstances, the Subdivision on Maritime Science of the Council for Science and Technology, Ministry of Education, Culture, Sports, Science and Technology (MEXT) formulated a research and development plan on marine science and technology (in January 2017; and revised in January 2019; hereinafter referred to as the "R&amp;D Plan") to clarify the fields of marine science and technology to be promoted and policies of promotion by the MEXT.</p> <p>The Agency has produced distinguished outcomes in various fields of marine science and technology. In this period of mid to long-term objectives, it is also expected to play a major role as a core institution for marine science and technology</p>	<p>for research and development on marine science and technology should capitalize on its capability to the fullest extent and take necessary actions to help our country evolve as a maritime nation. Especially during this period of the mid-term objectives, the Agency will make every effort to expand the research and developmental activities to achieve sustained growth in the future, and take active role in advancement of society, and deal proactively with important issues that our country is currently facing as indicated in "The 4th Science and Technology Basic Plan (Cabinet Decision, August 19, 2011), and realize the vision of Japan as a maritime nation as indicated in "The Basic Plan on Ocean Policy (Cabinet Decision, April 26, 2013), along with materializing the following missions:</p> <ol style="list-style-type: none"> <li>1. Promote R&amp;D strategically and selectively to meet national and social demands as a core agency for research and development on marine science and technology.</li> <li>2. Operate and offer for use of the most globally advanced research and development infrastructure to expand collective capabilities of our country in the field of marine science and technology.</li> <li>3. Disseminate actively the required information and findings obtained in the field of marine science and technology in order to foster better public understanding and contribute to the advancement of research on ocean and earth</li> <li>4. Contribute to interchanging of knowledge among world-renowned researchers and fostering and retaining them to pay a creative role and carry out functions of a globally connected hub for cycling talented brains in the field of marine science and technology.</li> <li>5. Draw out the potential of sea to the maximum extent, and promote innovations through industry-university collaboration and promote returning to the society the outcomes of research activities.</li> </ol>

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<p>in Japan by taking into consideration changes in domestic and international situations and accompanying issues as described above, and contribute to creating, disseminating and deploying high outcome levels through oceanographic observation and various R&amp;D projects by taking advantages of the strength of the Agency which owns and operates a number of research vessels and equipment. In this regard, an innovative collaboration system is expected to be established to maximize R&amp;D outcomes in marine science and technology in Japan as a whole, in addition to the optimization of work assignment and joint efforts to strengthen the current collaboration with other agencies. At the same time, efforts to improve the quality and pool of skilled and insightful human resources also need to be promoted for continuing R&amp;D on the oceans in the future and contributing to the sustainable development of marine science and technology.</p> <p><b>II Period of mid to long-term objectives</b></p> <p>The period of the mid to long-term objectives of the Agency is seven years from April 1, 2019 to March 31, 2026.</p> <p><b>III Matters concerning maximization of R&amp;D achievements, and improvement of the quality of other operations</b></p> <p><b>1. Promotion of fundamental R&amp;D in marine science and technology</b></p> <p>According to the 5th Science and Technology Basic Plan, the 3rd Basic Plan on Ocean Policy, and so on, the Agency needs to challenge the following issues to further expand its efforts for development in the future:</p> <ul style="list-style-type: none"> <li>• Solving economic and social issues including the conservation and sustainable utilization of global environment, and response to ocean originated natural disasters</li> </ul>	<p>Agency, as a R&amp;D type corporation defined under the “Basic Policy for Reform of Incorporated Administrative Agencies” (Cabinet Decision, December 24, 2013), will maximize R&amp;D outcomes and improve efficiency and effectiveness of business operations to stand out globally as a core institution in the field of marine science and technology. We sincerely hope the Agency can contribute to solving common problems facing human beings and develop science technology in our country while building organic collaboration and cooperation with concerned agencies in our country and overseas.</p> <p><b>I Period of medium term objectives</b></p> <p>The period to implement mid-term objectives is set from April 1, 2014 to March 31, 2019.</p> <p><b>II Issues related to service quality improvement and betterment of other businesses operations that are provided to people in Japan</b></p> <p><b>1. Promoting strategic/focused research development on a basis of national/social needs</b></p> <p>The Agency will define national/social needs and the role of Agency, expressly prioritize research and development in need and engage in R&amp;D cross-functionally in order to contribute to solving important policies addressed in the 4th Science and Technology Basic Plan and the Basic Plan on Ocean Policy. The Agency will also promote development of advanced fundamental technology that supports these</p>

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<ul style="list-style-type: none"> <li>• Contributing to safety and security of the oceans by reinforcing the oceanographic survey and observation system for establishing a Maritime Domain Awareness (MDA) system in collaboration with related ministries and agencies</li> <li>• Promoting R&amp;D concerning the integration, analysis and forecast of an enormous amount of oceanographic information to achieve Society 5.0 in the oceanographic science fields</li> <li>• Improving Japan’s R&amp;D capability in marine science and technology, and the international presence of Japan by providing scientific knowledge to the international frameworks such as SDGs</li> </ul> <p>For this purpose, the Agency will specifically put its focus on the R&amp;D themes listed in (1) to (4) below in this period of mid to long-term objectives. It will also promote challenging and original R&amp;D by taking advantage of flexible ideas and unique perspectives of researchers to help produce new knowledge that supports next-generation marine science and technology, as well as undertaking the development of fundamental technologies to support these R&amp;D projects.</p> <p><b>(1) R&amp;D for situational awareness of global environmental and forecast of changes</b></p> <p>The world is increasingly concerned about obvious and potentially serious effects of global warming and other environmental changes on economy and society in recent years. Measures for preserving global environment and mitigating climate change have also been considered as important political issues in the 3rd Basic Plan on Ocean Policy, SDGs, Paris Agreement and other treaties. In particular, the importance of investigation, observation and study of the Arctic region, in which the effects of global warming are most obviously, has been increasing worldwide. Human activities affecting global environment have resulted not only in global</p>	<p>R&amp;D activities and accelerate industrial applications and global deployment.</p> <p>The Agency will strengthen the collaboration with relevant domestic and foreign R&amp;D agencies and private businesses, keep R&amp;D progress under strict control, and engage in the following projects selectively. If the Agency sees more than expected R&amp;D progress during the period of midterm objectives, then it will prioritize R&amp;D flexibly from the point of implementing R&amp;D strategically on a basis of national/social needs.</p> <p><b>(2) Marine and global environmental change R&amp;D</b></p> <p>Global environmental problems are getting worse even further as can be seen by global warming and extreme weather phenomena that occur in many places globally and adaptation to them is an urgent issue that humans face today. To solve these problems, highly reliable predictions on the basis of accurate measurement of global environment change is required.</p> <p>To this end, the Agency will utilize high-level observation technology to the maximum extent with help of research vessels and drifting ocean data buoys, carry out comprehensive observations of global environmental change where ocean plays a major role, undertake R&amp;Ds to understand the impact of</p>

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<p>warming but also in various forms of natural phenomena including ocean acidification and ecological change. Understanding of changes in global environment and the forecast of future global changes are required based on the assessment of interaction between changes in global environment and human activities. Especially, the oceans are considered to take an important role, with its enormous volume, area and heat capacity, in environmental changes in a large scale of time and space, but largely remain unknown.</p> <p>Accordingly, the Agency intends to enhance its global environment change models and other means to understand more of the unknown part of environmental changes and provide a mid to long-term forecast of future changes. Means to achieve these objectives include the development and enhancement of observation networks by developing new observation technologies for building unmanned, power-saving and highly accurate observation networks, and carrying out highly accurate observation of major marine areas such as Asian sea including coastal region of Japan, Arctic sea, northwest Pacific, tropical Pacific and Indian Ocean by combining various techniques and methodologies. Accumulation and analysis of the data obtained through observations and improvement of global environment change models will help clarify the actual changes of global environment emerging in the ocean with temperature rise, ocean acidification, hypoxic sea water, marine ecological changes, and the processes of such environmental changes. Mid to long-term forecast of changes in global environment with the factor of human behaviors will be found by evaluating new insight for environmental changes, obtained through various efforts, and interaction between the nature and human activities. The results will be distributed to the world through domestic and international activities. This could contribute to making policies in Japan and the world.</p>	<p>global-scale environmental change on our country with help of latest prediction model, simulation technology and by making the most of “Earth Simulator” to contribute to solving these problems through the oceanographic solution. It will bolster its observations and R&amp;D efforts especially in the area of arctic waters that may impact the climate in our country substantially. Through these efforts, the Agency expects to have better comprehensive understanding of global environmental change by collecting, accumulating and analyzing observed data that relate to changes and fluctuations of climate, material circulation and marine ecosystem, and assess their impact on weather in our country. Also, in addition to contributions to international undertakings such as “The Intergovernmental Panel on Climate Change” (IPCC) and “The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services” (IPBES) by means of providing scientific findings and active dissemination of these data and information, the Agency will take the leadership in formulating international programs at meetings of “The Intergovernmental Oceanographic Commission”(IOC)of UNESCO and “The Group on Earth Observations” (GEO) to increase presence of our country and the Agency.</p>

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<p><b>(2) R&amp;D for sustainable and effective utilization of marine resources</b></p> <p>Marine resources such as a large variety of living creatures, minerals and energy sources are considered to exist in the oceans surrounding Japan, but these marine resources largely remain to be unknown, and only part of them are currently available for effect utilization. Particularly in the scientifically unexplored sea areas such as deep sea and deep sea floor, a plenty of unknown species of living thing are believed to exist and they are different from those in the surface sea areas. Among them are there those which could be useful for human society. The unknown function of the marine ecosystem must be discovered and clarified. For the effective utilization of mineral resources in the water of Japan, the particular sea areas containing potentially useful resources and their amount have to be found. It is therefore important to clarify the mechanism of formation of these resources.</p> <p>The Agency will analyze various specimens collected in ocean investigation and observation to understand carbon circulation, nitrogen circulation and energy circulation, etc. in the marine ecosystem, and promote interdisciplinary cooperation with nano science and information science to clarify unknown function of the marine ecosystem.</p> <p>Generation processes of potential resources will be clarified and sea areas containing seabed mineral resources identified by systemizing and generalizing the seabed resource generation model through detailed analysis of specimens and data obtained from investigations and observations up to now.</p> <p>The outcomes of R&amp;D themes described in (1) are applied as required to carry out these R&amp;D projects, and collaboration with other organizations including universities, public research institutions and private companies is considered to produce more effective results. The samples, data and scientific knowledge</p>	<p><b>(1) Seabed resources R&amp;D</b></p> <p>While there are confirmed existences of seabed resources such as submarine hydrothermal poly metallic ore, cobalt rich manganese crust, rare earth mud and methane hydrate in the surrounding oceanic area of our country, there still remain issues to be solved in advance of the continuous use of these resources.</p> <p>Thus, the Agency plans to conduct oceanographic surveys and in-house experiments utilizing the latest survey and analysis methods to quantitatively identify various factors affecting the formation of these seabed resources, and construct their formation models and elucidate causes. The Agency will also establish an efficient survey method utilizing the platform such as research vessel that conducts a field survey in wide expanse of seabed, manned submersible research vessel, and unmanned exploration vehicle together with latest sensor technology. Based on these survey results, the Agency will accelerate its scientific survey necessary to make use of seabed resources through collection of basic data obtained from wide expanse of sea.</p> <p>In addition, the Agency will carry out investigative studies to establish a method to assess environmental impact that is an essential part of the process to promote continuous utilization of seabed resources.</p> <p>To promote these investigative studies, the Agency will strengthen the collaboration with other R&amp;D agencies, colleges and private businesses, and promote transfer of developed technologies to private businesses to make these technologies available for at-sea survey immediately.</p> <p><b>(4) Marine life science and engineering R&amp;D</b></p> <p>It is necessary to understand structure, function and variation of marine</p>

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<p>obtained will be transferred to the industry in a proactive manner for promoting commercial utilization of marine resources.</p> <p><b>(3) R&amp;D on earthquakes and volcanoes in sea areas</b></p> <p>Earthquakes including potential Nankai Trough Earthquake and volcanoes such as seabed calderas in sea areas surrounding Japan are active and likely to cause large-scale disasters, suggesting that the state needs to provide stronger disaster prevention and mitigation measures. The situation awareness of earthquakes and volcanoes in sea areas and long-term assessment of potential earthquakes in sea areas are prerequisite to proceed with discussions on specific measures, but in reality, even observation data is not enough. The issue is to enhance scientific knowledge including understanding of earthquake mechanisms through the establishment of observation systems and data collection and analysis.</p>	<p>ecosystem, and understand underlining process and mechanism to create biodiversity of maintaining marine life and its continuous utilization. Also, unexplored area such as deep sea and under the seabed is the one for extreme environment biosphere, where living organisms adapted to their unique environment such as cold with high pressure can survive. Therefore, there is a possibility that some dwelling organisms have socially beneficial functions.</p> <p>Because of it, the Agency as a R&amp;D institution equipped with the most globally advanced R&amp;D infrastructure will conduct surveys in sea including survey on unexplored extreme environment biosphere under deep sea by utilizing latest observation technologies such as research vessel, manned submersible research vessel and unmanned exploration vehicle. Also, the Agency will elucidate function of the marine ecosystem, interaction with global environment and relationship with physical/chemical processes, and obtain research outcomes useful for elucidating mechanism contributing to the diversity of marine life. Furthermore, the Agency will make efforts toward future industrialization by promoting integration of life science field and engineering research through strengthened industry-academia collaboration. The Agency will create innovations by utilizing marine life specific functions under extreme environmental condition to the maximum extent.</p> <p>The Agency will contribute to international schemes such as IOC and IPBES through dissemination of the information about biological characteristics and biodiversity.</p> <p><b>(3) Sea area seismogenic zone R&amp;D</b></p> <p>To enhance disaster prevention and mitigation measures by comprehensively conducting surveys and analysis of dynamic behavior of certain areas where</p>

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<p>Accordingly, the Agency will accumulate data and insight for understanding earthquake mechanisms, present state and future progress of stuck plate conditions, and study on prediction of sea area volcanoes, and distribute information to related organizations including the Headquarters for Earthquake Research Promotion, Japan Meteorological Agency, National Research Institute for Earth Science and Disaster Prevention (NIED), and universities to help understand the present earthquake activities and provide long-term assessment, and assessment of sea area volcanic activities.</p> <p>To achieve these objectives, the Agency will develop and improve the seafloor geodetic observation to obtain continuous and real-time, wide-area and detailed data centering on the predicted source areas of Nankai Trough Earthquake in collaboration with related organization including the NIED and universities, and carry out high-precision surveys of ocean subsurface structure, and extraction and analysis of seabed sediment and rock samples. Data obtained in these projects will be integrated with existing data and used for analysis to improve the earthquake generation models and methods to predict the progress of stuck plate conditions. In addition, advanced observation techniques will be established for observing volcanoes in sea areas to understand the present activities of volcanoes in sea areas, and analysis of the earth's internal structure and the heat and mass circulation mechanism, etc.</p> <p><b>(4) R&amp;D for the enhancing and optimizing marine geophysics information using mathematical method</b></p> <p>Now that economic and social activities have been increasingly diversified, causing the destruction ecological system and biodiversity as well as climate change, ocean acidification and the deterioration of other global system functions,</p>	<p>subduction zone earthquakes occur, and understanding the mechanism of subduction zone earthquake and its social and environmental impact are urgent issues for our country because disaster caused by subduction zone giant earthquake and/or tsunami inflicts major damage on people that is a threat.</p> <p>Therefore, the Agency will install a real-time observation network for earthquakes and tsunamis into places under the sea, utilize high-level observation technology maximally with help of research vessel and ocean bottom seismograph, and conduct exhaustive surveys and observational studies of earthquake belts including Nankai Trough and Japan Trench. Additionally, Agency will construct a seismic physical model for subduction zone earthquakes by applying computational technique using “Earth Simulator” to quantify the current behavior of sinking tectonic plate belt and establish high-precision earthquake model and plate boundary model. On the basis of these results, the Agency will assess seismic disaster potential caused by earthquake and/or tsunami, disseminate information that can be useful to strengthen disaster prevention and mitigation measures in our country and get the picture of the impact of earthquake and tsunami on ecosystem and its recovery process.</p>



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<p>comprehensive efforts are required for finding solutions for the issues mutually relating to global environment and social economics to continue the affluent society in the future. Conventionally, measures have been taken according to the knowledge obtained from individual R&amp;D themes in the preceding (1) to (3), but the effects of these measures must be verified from a scientific standpoint to select meaningful measures, because some of these measures bring co-benefit for global environment and social economics, while others are put in the trade-off relationship, in which some have to be abandoned to implement others.</p> <p>For this reason, the Agency will promote the development and operation of the information infrastructure for efficient implementation of high-level numerical analysis to discover and clarify mutual relationships between complicatedly entangled the ocean, ground and life, while collecting and accumulating information and data on the ocean, ground and life in collaboration with various researchers and engineers in the Agency, and related organization in Japan and abroad, and consolidating, integrating and analyzing this data using a highly sophisticated mathematical method. It will also produce and offer information suitable for the needs of users who are not familiar with expert knowledge about mathematical and information sciences by providing a highly effective user interface.</p> <p><b>(5) Challenging and original R&amp;D and development of advanced fundamental technologies</b></p> <p>The ocean is a frontier still left for mankind. It contains areas inaccessible by humans such as ice bound seas, deep sea floors and ocean sub-bottom areas, and a large variety of unknown species of living thing. To explore the frontier or new fields, we must first develop and make use of the intellectual base for science and</p>	<p><b>(5) Development of advanced fundamental technology and its utilization</b></p> <p>It is essential to upgrade vessels, ocean observation network and observation equipment to obtain many different kinds of data during oceanographic investigative research and development in order to understand wide expanse of sea comprehensively. It is also very important for promoting marine science technology for our country. Because of it, the Agency will take on the challenge</p>

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<p>technology to set out for challenges. With this, it is expected that mankind creates new intellectual property and innovation.</p> <p>Accordingly, the Agency will challenge formidable scientific research with novelty and originality to develop new academic disciplines or technological fields which may lead the world by founding a flexible and maneuverable research system exceeding the conventional framework of fields and organizations, and promote a bottom-up type technological development by combining ideas of free-minded researchers and new technologies. This can create research and technology seeds for the future and a technology infrastructure unique to Japan.</p> <p>The Agency will develop a platform for marine investigation and observation, essential for challenging the unexplored frontier, and improve techniques and skills to operate the platform, as well tackling the enhancement of marine investigation and observation technologies including maritime robotics, deep-sea probe technologies, very deep water and deep underground drilling technologies to contribute to promoting national ocean policies by maximizing the outcomes of R&amp;D themes in the preceding (1) to (3), and strengthening the marine investigation and observation system useful for MDA. This may result in the achievement of safe and efficient operation of the platform, and acquisition of highly accurate exploration and survey capabilities suitable for various oceanic and under-the-seabed environments including deep sea floors and ice bound seas.</p> <p><b>2 Formation of a core institution for marine science and technology</b></p> <p><b>(1) Promotion of social return of R&amp;D outcomes through closer collaboration with related organizations</b></p> <p>To contribute more to solving various social economic and global issues, the Agency needs to strengthen collaboration and partnership with related</p>	<p>of stepping into unexplored frontier, develop advanced foundation technology enabling the development of new frontiers. Then through maximum utilization of these measures, the Agency will work on R&amp;D themes listed in the above (1) to (4) proactively and cross functionally.</p> <p>Specifically, the Agency will utilize findings, which will be obtained during the survey of deep subsea floor yet to be explored by humans and conducted by offshore drilling by a deep earth exploration drilling vessel “Chikyu”, to the fullest extent to help the Agency engage in R&amp;D to validate emerging scientific propositions. Thus, the Agency may play an important role in implementing IODP (International Ocean Discovery Program) Science Plan.</p> <p>Technology of simulation science together with its theory and experiment is an essential advanced foundation technology to increase our country’s competitive edge. On the basis of accumulated expertise and by utilizing “Earth Simulator” to the fullest extent, the Agency will engage in R&amp;D in advanced information fusion science and mathematical science for mathematical modeling and simulation necessary to promote marine-earth science.</p> <p>Additionally, deep sea survey system such as manned submersible research vessel and unmanned exploration vehicle is an essential foundation technology to explore ocean frontier. Agency will engage in upgrading these systems, develop elemental technologies and establish operational technology for these systems to conduct observations and surveys efficiently and effectively.</p> <p><b>5. Innovation creation and promotion of the return of results to the society through the industry-academia cooperation</b></p> <p>The Agency will make efforts to create R&amp;D-based innovation and return its outcomes to society, thereby providing new solutions to improve the living standard</p>

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<p>organizations in Japan and abroad including universities, public research institutes, and private companies, and at the same time, promote strategic utilization of its R&amp;D outcomes and intellectual property. To achieve this, the Agency will strive to acquire the rights of registering its achievements and know-how as intellectual property, build a collaborative system for creating new values together with related organizations, and create technology seeds for the future by carrying out exploratory R&amp;D. It is important to transfer information based on R&amp;D outcomes in an easy-to-understand way according to the social and economic needs, and maintain and manage R&amp;D outcomes including papers and patents in an appropriate manner.</p> <p>The Agency will actively cooperate for the international framework as a core institution for marine science and technology in Japan, and strengthen collaboration with major research institutions overseas. To promote scientific drilling projects using deep sea drilling vessel CHIKYU under the science plan of the Integrated Ocean Drilling Program (IODP), special efforts are taken for closer collaboration with related organizations, encouraging Japanese to participate in the project and increasing participating nations.</p> <p>The Agency will promote active participation in national projects such as the Strategic Innovation Creation Program is promoted to vitalize the Agency’s R&amp;D activities, further develop R&amp;D outcomes and return the results to the society, and proactively introduce externally-raised capital such as private funds is promoted.</p> <p>To foster researchers and engineers who are supposed to lead the future of Japan as an oceanic state, the Agency will strengthen collaboration with universities, private companies and public research institutes, etc. for proactively accepting outstanding young researchers and post graduate students in Japan and abroad, as well as extending the science and technology infrastructure through collaboration</p>	<p>of people and solve social issues. To this end, the Agency will strategically strengthen coordination and collaboration with domestic and foreign colleges, companies and research agencies, manage outcomes properly including acquisition of patent rights on R&amp;D results, and make further efforts to make R&amp;D outcomes practical and toward commercialization.</p> <p>The Agency will engage aggressively in R&amp;D activities in response support projects promoted primarily by our government to give R&amp;D outcomes back to society.</p> <p>The Agency will not only put its own money into the fund to support R&amp;D on marine science and technology but also obtain external funds including competitive funds and use them effectively.</p> <p><b>4. Promotion of the international cooperation and human resources development as a base of brain circulation progresses on a global scale</b></p> <p>The Agency as a core agency for marine science and technology will cooperate proactively in the international framework and promote collaboration with major foreign research agencies to stand out as a hub for international brain circulation.</p> <p>The Agency as a R&amp;D agency owning the most globally advanced fundamental research infrastructure including a deep earth exploration drilling vessel “Chikyu” will create a favorable research environment as a hub for international brain circulation of talented researchers coming from all over the world. Additionally, the Agency will boost activities at IODP through the Agency’s support to J-DESC (Japan Drilling Earth Science Consortium), including supports to researchers and human resource development. The Agency will contribute to developing marine science and technology and benefiting to society, together with demonstration of international presence of our country.</p>

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<p>with high schools to reserve human resources who are potentially active in the future marine science and technology sector.</p> <p>For improving public understanding on marine science and technology, strategic publicity will be deployed with the characteristics of various layers of society in mind. To expand publicity to the layers difficult for the Agency itself to penetrate, it is important for the Agency to extract a bandwagon effect by collaborating with the companies and organization in any sectors.</p> <p><b>(2) Promotion of sharing large research facilities and data, etc.</b></p> <p>The Agency will let external organizations in the industry, academy and government use its facilities and systems including marine survey platforms, and computer systems, for the development of marine science and technology.</p> <p>Under a close partnership with the Atmosphere and Ocean Research Institute of the University of Tokyo and other laboratories, the Agency will formulate a ship</p>	<p>The Agency plans to engage in fostering young researchers in collaboration with colleges, universities and graduate schools, create favorable environment to help increase the participation rate of female researchers, and nurture talents, who represent the best of maritime nation of Japan in the future, from a wide range of marine science and technology field.</p> <p><b>3. Provision and pro-motion of usage of the information related to the marine-earth science</b></p> <p><i>(1st paragraph to “III 2 (2) Promotion of availability of large-scale R&amp;D infrastructure and data, etc.”)</i></p> <p>The Agency will promote disseminating information on R&amp;D outcomes proactively through submission of research papers, oral presentation at workshop and lead the world as a core agency for marine science and technology. Especially, the Agency intends to do efforts and increase the number of citations for high-quality research paper submitted. Additionally, the Agency plans to create innovations and contribute to society through delivery of information with its better utilization.</p> <p>The Agency will disseminate information of R&amp;D outcomes to people in our country proactively by means of press release, public relations magazines, internet and exposure of facility/equipment to improve people’s understanding of the sea. Research activities, research outcomes and giving them back to society are often relating to the most advanced science and technology, thereby making their contents and significance difficult to understand for many people. Therefore, it is important to disseminate easy to understand specific information and have people’s better understanding of the significance of the research in question and obtain their support to the research.</p>

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<p>operation plan for efficient operation of research ships with special consideration on the features of academic research thereby cooperation with universities and organizations shared by universities for their academic research.</p> <p>Information concerning marine science and technology such as data and samples obtained from research activities will be categorized and stored properly based on the nature and importance of information, and offered not only to researchers but also general public in an adequate manner according to their needs.</p> <p><b>IV Matters concerning improvement and streamlining of administration</b></p> <p><b>1. Establishment of a proper and efficient management system</b></p> <p>The Agency will further reinforce its organizational management capability under the leadership of the President to accomplish the role as a core institution for marine science and technology, and improve appropriateness of administration by increasing administrative efficiency and tightening internal control including risk</p>	<p><b>2. Building the basis of R&amp;D</b></p> <p><i>(Please see the section re. operation “III 1 (5)Challenging and Unique R&amp;D and Development of Advanced Foundation Technology”)</i></p> <p>The Agency, as one of top-level R&amp;D agencies globally and owning the most advanced R&amp;D infrastructure for national critical technology in the field of marine science and technology, will use by itself its own facilities such as research vessel, deep sea research system and the “Earth Simulator”, and make them available for external use to benefit the progress of science and technology such as marine science and technology unless it won’t interfere with R&amp;D activities at the Agency. Under a close partnership with the Atmosphere and Ocean Research Institute of the University of Tokyo and other laboratories, the Agency will formulate a ship operation plan for efficient operation of research ships with special consideration on the features of academic research thereby cooperation with universities and organizations shared by universities for their academic research.</p> <p>Agency will make the deep earth exploration drilling vessel “Chikyu” available for use internationally through the Chikyu IODP Board within the frame of IODP. Also, it will be available for exploration in response to the request from external agencies to the extent that smooth execution of tasks and plans of Agency is not interfered with, for the benefit of accumulating exploration technologies.</p> <p>Since updating the “Earth Simulator” is scheduled during the period of mid-term objectives, the Agency plans to update and maintain the “Earth Simulator” in a serviceable condition by factoring in domestic and overseas trends of science and technology in the field of earth science, and maintenance conditions of a large scale computer.</p>

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<p>management and compliance. Effective efforts must be taken especially to prevent misconduct in research activity and misuse of research expenditures by observing measures against research misconduct in compliance with the guideline issued by the government. To obtain more achievements in R&amp;D, the Agency will strengthen inter-department collaboration in the Agency, and build an R&amp;D system to enable the whole agency to tackle problems in an integrated manner, as well as reflecting the national policies and latest R&amp;D trends in Japan and abroad in research projects. Also required is the thorough implementation of the PDCA cycles such as the inspection of effectiveness and efficiency in management on a timely basis for further improvement.</p> <p><b>2. Rationalization and efficiency of operations</b></p> <p>The Agency will promote rationalization and efficiency of operations by reviewing the governing structure, streamlining procurement, computerizing operations, and ensuring efficient operational system.</p> <p>With regard to the projects to which operating expenses grants are allocated, efficiency will be raised to xx% or more compared with the initial fiscal year in the period of mid to long-term objectives for general administrative expenses (excluding personnel expenditure, mandatory expenses and taxes and public dues), and xx% or more compared with the initial fiscal year in the period of mid to long-term objectives for other expenses (excluding personnel expenditure) with the exclusion of new and expanding projects which are subject to efficiency improvement in the next fiscal year.</p> <p>As for salary levels, the Agency will carefully consider the salary levels of national</p>	<p><b>3. Provision and promotion of usage of the information related to the marine-earth science</b></p> <p>Agency will collect and promote digitization of information and documents relating to marine science and technology including data and sample that were acquired during research activities, and save, store and provide informs easy-to-use for researchers and general population.</p> <p><i>(Following paragraph previously mentioned)</i></p> <p><b>III Items concerning the efficiency of the administration of the operations</b></p> <p><b>1. Flexible and efficient system operations</b></p> <p>The Agency will undertake agile and efficient operations by clarifying the scope of discretion and responsibility under the leadership of the President, so that maximum R&amp;D achievements can be expected. Also, the Agency will prepare a framework to allow solicitation of external advice/proposal relating to management strategy for the Agency in view of expertness and internationality.</p> <p>The Agency will continue organizational adjustment and efforts to strengthen governance and enhance internal control to keep proper business operations and risk management going toward achievement of the mid-term objectives.</p> <p>Management of the Agency should share the management responsibility for R&amp;D operations with clear boundaries and receive reports on the progress of research plan on timely basis to ensure appropriate resource distribution, assess research activities and operations regularly, publish assessment results and utilize them aggressively to make R&amp;D operations more activated and streamlined. To assess the efficiency of R&amp;D operations, the Agency plans to introduce proper metrics helpful to measure the progress of R&amp;D to ensure objectiveness and efficiency of the assessment.</p>

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<p>public officers, verify what salaries for officers and staff should be, maintain proper levels in light of special characteristics of duties, and release verification results and the state of efforts.</p> <p>Streamlining of contracts will be promoted by ensuring the efforts according to the “Policy for Streamlining Procurement by Incorporated Administrative Agencies” (decided by the Minister of Internal Affairs and Communications on May 25, 2015), while fairness and transparency of operation are ensured. These efforts will be inspected or reviewed by the internal audits or Contract Monitoring Committee.</p>	<p><i>(Following paragraph to “VI 1. Maintain and Boost People's Confidence level”)</i></p> <p><b>2. Streamlining and efficiency of operations</b></p> <p><b>(1) Rationalization and streamlining of operations by the Agent</b></p> <p>The Agency will improve operational efficiency through cost reduction, rationalization and streamlining of operations including streamlining administrative department with considerations of not harming the R&amp;D capability.</p> <p>The Agent will cut administrative expenses (including labor cost but not taxes and public dues) by 10% or more and other operational expenses by 5% or more compared to the budget set for the first year of the mid-term objectives excluding expenses imposed by various regulations for operating a corporation. Also, for additional or expanded tasks, rationalization and streamlining of operations should be implemented in the same manner in the following year and thereafter.</p> <p>As for salary levels, the Agency will carefully consider the salary levels of national public officers, verify what salaries for officers and staff should be, maintain proper levels in light of special characteristics of duties, and release verification results and the state of efforts. Total labor cost should be reviewed diligently in accordance with the government policy.</p> <p><b>IV Items regarding improvements in financial related matters</b></p> <p><b>3. Appropriateness of contract</b></p> <p>In principle, contracting process should be a competitive one including open competitive bidding. In the case of limited tender contract, result of the tender should be published to ensure fairness and transparency. Additionally, the Agent is supposed to implement faithfully actions in accordance with “Promotion of the</p>

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<p><b>V Matters concerning Improvement in Financial Conditions</b></p> <p>The Agency will make efforts to reduce as much expenditure as possible through efficient budget execution, and secure, increase or utilize self-generated income including revenue from entrusted business, patent royalty and facility usage, and externally-raised capital such as competitive research funds.</p> <p>In light of the revised accounting standards of incorporated administrative agencies, the Agency will continue to manage budgets and results in monetization units in accounting treatment of operating expenses grants.</p> <p>The Agency will execute budgets in a well-planned manner in consideration of debt service payments of operating expenses grants, dispose of its own property when it is no longer necessary, and in the case of transferring any important property, proceed with a plan.</p>	<p>Rationalization Plan of Contracting by Incorporated Administrative Agency” (Minister of Internal Affairs and Communications Decision May 25, 2015).</p> <p>In the case of one-party bidding, method of public notice, requirements for bid participation and ordering size should be reviewed and its reviewing result should be published.</p> <p>Contracting process should be improved by inspections run by internal audit and third party.</p> <p><b>(2) Review of office work business</b></p> <p>The Agency is supposed to take following actions faithfully in accordance with the government policy determined by the past cabinet decision and take measures necessary for rationalization and streamlining of operations and organizations at the Agency.</p> <ul style="list-style-type: none"> <li>a. Concerning research centers, etc., the Agency is supposed to streamline operations and reduce cost through reorganization and consolidation in parallel with prioritizing R&amp;D contents and organizational restructuring.</li> <li>b. Dense Ocean Floor Network for Earthquakes and Tsunamis (DONET), currently in the maintenance stage in the Nankai Trough sea area, will be transferred to an incorporated administrative agency “National Research Institute for Earth Science and Disaster Resilience” (NIED) after its maintenance work. Also, the Agency will further strengthen collaboration with NIED including promotion of personnel exchange in the area of disaster prevention and mitigation.</li> <li>c. Operation of the Muroto Misaki-oki Ocean Floor Network System will be terminated once DONET becomes operated.</li> <li>d. The Agency will continue to study the issue of centralized examination of</li> </ul>



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<p><b>VI Other Important Matters concerning Administrative Operations</b></p> <p><b>1. Ensuring and enhancing people’s reliability</b></p> <p>In order to ensure appropriate business operations and people’s reliability, the Agency will publicize information appropriately and proactively, and make efforts to protect personal information appropriately as well, subject to the "Act on Access to Information Held by Independent Administrative Agencies" (Act No. 140 of 2001) and the "Act on the Protection of Personal Data Held by Independent Administrative Agencies" (Act No. 59 of 2003).</p> <p>In light of the Common Standards of Information Security Measures applicable to government agencies, the Agency will take appropriate information security measures to reinforce its defending power and organizational response to cyber attacks with thoroughly training of its staff, as well as grasping the implementation of measures every year to improve information security measures based on the PDCA cycle.</p> <p>With sufficient consideration for safety when jobs are performed, labor, safety and health management will be implemented thoroughly to prevent accidents and promote safe and smooth operation according to related laws and regulations.</p> <p><b>2. Matters concerning personnel affairs</b></p> <p>For maximizing R&amp;D outcomes and implementing effective and efficient</p>	<p>academic research topics and should reach the conclusion in the early period of the mid-term objectives. On the basis of the conclusion, the Agency will review budget and related organizations including staffing, thereby improving efficiency of operations as a whole.</p> <p>e. The Agency should continue to study the issue of contracting operation of the academic research vessel and should reach a conclusion of the matter in the early period of the mid-term objectives.</p> <p>f. From the point of efficient R&amp;D activities, operation of research vessel should be terminated once a wide-area seabed research vessel is in operation and if needs for service by research vessel become lower.</p> <p><b>IV Items regarding improvements in financial related matters</b></p> <p>The Agency will endeavor to be self-funding, execute budget efficiently and secure sound financial position. The Agency should estimate annual amount of management expense grants strictly while keeping the amount of management expense grants liabilities in mind.</p> <p><b>1 Efforts to increase the self-funding amount</b></p> <p>The Agency will receive a few external research grants including competitive research grants provided by the government, other incorporated administrative agencies and private businesses. The Agency also looks at aggressive actions to increase amount of self-funding by means of contract service revenue, patent licensing revenue, and income from facility and equipment use fee from the government, other incorporated administrative agencies and private businesses.</p> <p>The Agency plans to include the amount of self-funding in the annual income and expenditure plan to be prepared for each fiscal year and carry out its operations by</p>

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<p>operations, the Agency will make efforts to secure and foster diversified, highly competent and insightful human resources with leadership ability, and in particular, recruit outstanding researchers in Japan and abroad by actively making use of a cross-appointment system, etc. Its efforts also extend to maintaining and improving the workplace environment and raising productivity with the right persons in the right places and appropriate evaluation and treatment of staff to raise their motivation in response to diversified work style.</p> <p><b>3. Matters concerning facilities and equipment</b></p> <p>The Agency will intensively and efficiently update and improve the facilities and equipment required for execution of business operations including measures to mitigate their aging.</p>	<p>following the annual plan.</p> <p><b>2 Efforts to reduce fixed expenses</b></p> <p>By streamlining administrative works and efficient facility operations, the Agency plans to reduce fixed expenses.</p> <p><b>3. Appropriateness of contract</b></p> <p><i>(This issue to “IV 2. Operational rationalization and streamlining”)</i></p> <p><b>III Items concerning the efficiency of the administration of the operations</b></p> <p><b>1. Flexible and efficient system operations</b></p> <p><i>(Paragraph 1 to 3 already mentioned above)</i></p> <p>The Agency will take proactive actions to disclose information including information about rationalization and streamlining of operations and staffing to secure people’s confidence in the Agency by conducting proper operations at the Agency and disseminating its activity abroad. In such cases, the Agency needs to be careful with its handling of personal information.</p> <p>To execute business, the Agency will strictly adhere to laws and regulations and endeavor to secure the safety.</p> <p>The Agency will prepare favorable information system environment in accordance with government policy to install appropriate information security measures for business operations at the Agency.</p>

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	<p><b>V Other Important Matters concerning Administrative Operations</b></p> <p><b>2. Matters concerning personnel affairs</b></p> <p>The Agency plans to undertake measures to retain and allocate staff properly, conduct performance appraisal, treat them properly and improve staff performance, and also create an attractive work environment and provide child-rearing support services.</p> <p><b>1 Issues concerning facility and equipment</b></p> <p>The Agency will carry out updating and maintenance of facilities and equipment necessary for promoting the intended research work selectively and as planned.</p>