

 2019 Annual Plan



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Introduction

Climate change is high on the political agenda, making our mission of *Enabling Delta Life* more urgent than ever. That requires sound knowledge for innovative, sustainable and global solutions. Robust solutions for the present and the future that can cope with unpredictable and rapidly changing circumstances. Many colleagues work at Deltares because they want to make a positive contribution here.

The 2018-2021 Strategic Agenda is the guideline for achieving our ambitions as an independent knowledge institute in the field of water and the subsurface, both nationally and internationally. The cornerstones of the chosen strategy are: excellent knowledge at the top international level, enhancing our social impact and linking our knowledge to the market. The implementation of innovations is an excellent way of establishing closer links with practice. We work from a position between the public and private sectors, and between science and practice.

This annual plan describes the extra steps that we have planned for 2019 in order to achieve the goals in the Strategic Agenda in addition to our current activities.

Room for strengthening our knowledge base

Positive news. After years of cuts, we have been granted more financial resources for the knowledge base. Thanks to a larger contribution from government, we can once again focus more on

the long-term social issues. This solid knowledge base is essential so that well-founded decisions can be made in the future based on knowledge that is not disputed.

Deltares will be working in line with the new mission-driven innovation policy of the national government, which is moving forward on the basis of the collaboration in the top sector approach. The government introduced this approach to maintain the position of the Netherlands as one of the most competitive and innovative countries worldwide. The aim is to increase the impact of research and innovations and to accelerate the development of solutions for complex social problems. For Deltares, this means actively collaborating with research institutes and other excellent partners. Inside our organisation, we will also be looking more emphatically for ways to work together and tackle issues in an integrated and multidisciplinary way. There is a high level of eagerness to work together in our organisation: 'dare to share' is our motto.



Sustainable solutions

Sustainable solutions are needed to provide future generations with a viable future. We make a major contribution to safe and sustainable life in deltas and so we deliver considerable added value for society. Corporate Social Responsibility (CSR) is therefore the guiding principle behind our work and conduct. CSR is at the core of our company: we see for ourselves how relevant our work is. Our work matters. That applies to knowledge development and projects: issues that often have a major impact on peace, security and health worldwide. And also to our business operations, such as the sustainable employability of our workforce and the reduction of our environmental footprint. We are also working on putting these things more in the picture.

Ten years of Deltares

We organised a wonderful series of celebrations for our tenth anniversary in 2018. They were launched when the new campus was opened by Minister Cora van Nieuwenhuizen. That was followed by a spectacular staff party, a high-profile symposium, a highly-appreciated contact day and an open day with more than 3,000 visitors. And above all thanks to the efforts of all our colleagues, it was an

'Deltares belongs to us all'

unforgettable jubilee week. More than 250 colleagues were present as volunteers to talk passionately about their work or to show our guests around safely. With a priceless result in terms of client relations, PR and pride in the work of ourselves and our colleagues. We demonstrated that Deltares is an open knowledge and research institute with an impact. We did exactly what we claim: we are a community that is open to sharing knowledge. This anniversary was a powerful symbol of that: 'Deltares belongs to us all.'

Listening

Deltares is a learning organisation. We learn from each other and from the outside world. In order to make a more robust selection of research areas for the future, we will be looking at this aspect in greater depth by organising stakeholder consultations in 2019. There will also be discussions within the organisation. All this will provide the building blocks for a more clearly-defined story about the role of Deltares and how we contribute to our mission '*Enabling Delta Life*'. That story will be understandable, people will be able to identify with it and it will motivate them, inside and outside our organisation.



CHAPTER 1



Positioning Deltares: where knowledge and the market meet



The characteristic Deltares position is located where knowledge and the market meet. Between the public and private sectors, and between practice and science. As an independent institute, we are involved in knowledge development and in linking that knowledge to the market. There must be no doubts about the quality of our knowledge, or our consultancy and research results, and so we are constantly focused on the development, application and safeguarding of our knowledge. Our data can be traced back and our research approach is transparent.

Our knowledge is based on the latest scientific insights and it responds to experience and questions on the ground. Knowledge that is both robust and relevant to practice is the guiding principle behind the three cornerstones underlying our strategy and position. First of all, we have *excellent knowledge* at the top international level. We opt for international excellence in several disciplines. In addition, our work has *added value for society*. Deltares knowledge is applied to important social issues relating to life in deltas. *'Linking our knowledge to the market'* means that our knowledge is applied in practice. In turn, that results in new insights and research questions.

'Undisputed knowledge'

These cornerstones are described in greater detail in our 2018 - 2021 Strategic Agenda. They remain as important as ever. We are on track and no significant changes will be required in 2019. However, three areas will need extra attention in 2019.

Public mission

The public mission of Deltares is extremely important and it will remain so. We see it as our main duty to continue with the development of

our relevant knowledge base in order to keep our delta habitable, now and in the future. The Ministry of Infrastructure and the Environment will continue to be our leading client in 2019. That alliance is shaped with the Water, Traffic and Living Environment (WVL) department of Rijkswaterstaat (RWS).

'Public mission is important to keep the delta habitable'

In 2019, Deltares's research for the long-term will be developed primarily in a dialogue with the Ministry of Economic Affairs and Climate, the Ministry of Infrastructure and Water Management and the Ministry of Education, Culture and Science. In the context of the Water and Security priority area, among others, we will also be engaging in research that is relevant for the Ministry of Foreign Affairs. In addition to the ministries, the water authorities, the provincial authorities and the leading municipal authorities are important stakeholders. In 2019, we will be moving forward with the North Sea and Rivers dossiers in order to provide integrated advice about the impact and spatial integration options for the various plans resulting from initiatives that also involve the market.



Link with practice

The second focus is the link we have with practice. In general, we have good links with the scientific world but our relationship with applications in the field is an area requiring attention. This is the case in areas including ecology, water quality, geo-engineering and groundwater. In order to strengthen our relationship with actual practice, we will be establishing an exchange programme with the market and government in 2019 that will focus specifically on more involvement in operational projects. In addition, we will be involving 'research-oriented' employees from private bodies in the implementation of our research projects.

At the national and international levels, we work with the Dutch business community where possible. Knowledge development and application in collaboration with Dutch consultancy firms are important for our clients and for Deltares.

We discuss how we collaborate with the Dutch consultancy firms on the development and

application of knowledge with the umbrella organisation NIngenieurs. In 2019, we will be updating the agreement with NIngenieurs that has now been in place for a decade.

Innovation is the engine of economic growth, our competitive strength and the answer to challenges facing society. Innovative SMEs play an important role here. To boost Dutch innovative strength, we want to intensify cooperation with SMEs in 2019 by involving them more often in projects and by making our knowledge widely available.

International strategic alliances

The third area requiring particular attention in 2019 is the relationship with our international strategic partners. Deltares wants to establish a more clearly-defined position, to focus on relevant top knowledge with a focus on our contribution to the achievement of the sustainable development goals (SDGs). If we want to be in the international top, we will have to further develop strategic alliances with partners.

'Insights from international advisory board for the further development of strategic partnerships'

To complement the work of our national advisory board in the national context, we also established an international advisory board (IAB). The IAB advises Deltares about international developments and how we can respond to these developments. This advisory board, which has a wide-ranging international network, will play an important role in the years to come in the development of our international position.



Actions

- Establish and implement an exchange programme between the market, government and Deltares with the aim of raising involvement in operational projects;
- Strengthen our relationship with the Dutch consultancy firms. In 2019, we will update the covenant with NLEngineers that has now been in place for a decade;
- Strengthen the relationships with our long-term partners, national and international, and establish new strategic relationships.





CHAPTER 2



Knowledge and market strategy: robust solutions for global challenges



We are increasingly seeing the effects of climate change and changing weather patterns on society. Extreme weather, sea level rise, land subsidence, salinisation and desiccation are increasingly pressing issues. Nationally and internationally. Just remember the large-scale floods worldwide and long periods of drought, even in the Netherlands, last summer. And the floods caused by cloudbursts. Increasing demand for water and food due to population growth, economic growth and urbanisation will also increase the pressure on vulnerable deltas and ecosystems.

Mission-driven research for sustainable transitions

These worldwide social challenges require robust, sustainable and integrated solutions. Accordingly, we are seeing an increasing focus in international and national agendas on the challenges facing society. For example, the Dutch government, including the Ministry of Infrastructure and Water Management and the Ministry of Economic Affairs and Climate, is working on sustainable transitions in the fields of energy, the circular economy, transport, infrastructure, the living environment and urban development, food and health.

Missions

In 2019, the government will formulate missions for a number of themes affecting society. Missions are challenging and achievable objectives, for example in the field of energy and sustainability, agriculture, water and food, and flood risk management and climate. This involves close consultation with relevant stakeholders such as research institutes and business. The missions will guide the innovation agendas of the top sectors and, consequently, institutes for applied research such as Deltares. The same applies to the new European

framework programme, Horizon Europe. From 2019 onwards, our research will therefore be increasingly 'mission-driven'.

Social themes and Research Agenda

The Deltares 2018-2021 Research Agenda sets out in detail our research lines, ambitions and intended impact, and clearly describes how they are related to the SDGs. Here too, the link is made with our ambitions in the international regions. We follow the line adopted in the past, focusing on our themes: Flood Risk, Ecosystems and environmental quality, Water and subsoil resources, Delta infrastructure and Adaptive delta planning. Enhancing our understanding of these themes is crucial in terms of developing solutions for the challenges facing society. For more details about the research lines in the themes and programmes, you are referred to our research plan (2019 Activity Plan).

Knowledge for the market

The strengthening of the link between knowledge and the market is a goal for 2019. We aim to achieve this by, among other things, identifying and elaborating the main national and international subjects of the future that bring together market demand and knowledge

development, and guide the further development and positioning of Deltares.

Long-term knowledge development

In recent years, funding from the Dutch central government has tended to decline sharply. As a result, Deltares was unable to continue delivering adequate support for the knowledge base required. That has been acknowledged in a range of internal and external policy reports and evaluations. As of 2018, the government has

'Robust, sustainable and integrated solutions'

promised additional resources for maintaining and strengthening our knowledge base. The additional funding is primarily intended to ensure that we can provide effective support with our knowledge for the challenges (and primarily the long-term challenges) facing society. Deltares has drawn up a plan for this purpose in close consultation with the departments concerned. We focus on three main topics that are important for the long term: (1) water, flood risk management and climate, (2) sustainable living environment and (3) future-proof infrastructure.

In the case of the *first* topic – water, flood risk management and climate – we are researching the limits of the adaptive capacity of the Netherlands. This is a response to new thinking about the speed of sea level rise in the future. In addition, we have seen that extreme weather conditions, both dry and wet, are becoming

more frequent. We want to know what that implies for water management, living environment and infrastructure, now and in the future.

In the context of the *second* topic – the sustainable living environment – our research will focus in 2019 on the consequences and opportunities of the energy transition and circular economy for the subsurface and water management. This will also involve looking at the quality – ecological and otherwise – of water/groundwater and the subsurface and how we can sustainably maintain quality.

The *third* topic is the infrastructure. Infrastructure is excellent in the Netherlands and we take its availability for granted.

We want to engage in research looking at how

'Focus on long-term flood risk management and climate, sustainable living environment and future-proof infrastructure'

we can maintain this situation in the future. This is of major importance given the high demands on reliability, land substance, sea level rise and more extreme weather.

Enabling technologies

Deltares uses the *Enabling Technologies* theme in our efforts to establish a stronger position as a research institute that works with the latest developments in data science, software and monitoring. Many of these technological



innovations are potential game changers. We want to know, understand and apply these new technologies in the light of our motto 'Enabling Delta Life'.

Accordingly, we use the theme as a platform for the initiation of a range of activities, pilot projects and scans that involve coordination with the five social themes. This effort has been elaborated in detail in the 2019 research plan. The focus in 2019 will be on boosting our capacity in the field of data science, strengthening the Deltares portfolio in the field of enabling technologies, and expanding and operationalising our network with parties in this area. Intensive collaboration with early adopters, and large and small partners, will further our knowledge and effectiveness. We are looking for inspiring contacts at home and abroad with whom we can move forward outside

the well-trodden pathways and think outside the box in order to identify new solutions for the social issues on which Deltares works.

'Potential game changers'

In our projects, we concretise a hybrid approach to data, software and monitoring. We look for applications in cross-theme topics where we focus on the long-term development of knowledge, and in our work with the North Sea and Rivers teams. We are using the project in Manila Bay as an international focus. This project provides us with a picture of the far-reaching problems that the city faces now and in the coming decades. It also gives us access to the multiple sources of data about the current and historical situation relating to water, the subsurface and spatial planning.

2 Knowledge and market strategy: robust solutions for global challenges

This will give us the opportunity, in parallel or in the project, to assess what we learn from our data science and software skills, and to identify the knowledge we still require.

'Increasing the effectiveness of the Dutch water sector by drawing on emerging technologies'

In concrete terms, as one of the initiators, we will be committed to making a success of the new *DigiShape* network. *DigiShape* is to operate as a network, for the time being in the Netherlands, in the 'golden triangle', the alliance between government, the business community and research institutes, to bring about the digitisation of the water sector. A second concrete initiative is the collaboration with a start-up accelerator for Smart Cities. This will establish a stronger link between ourselves and the start-up world and allow us to learn about new ways of marketing tools and services.

Coordinated programming

An important underlying principle in the programming of our knowledge development for the coming years is 'coordinated programming'. The research agenda must therefore be more of a joint knowledge agenda than at present. To achieve this goal, we are setting up a more coordinated structure for processes that have generally been separate until now. This will include areas that include the institutional funding (SO, strategic research), the KPP program (Knowledge for Primary Process, for the Ministry of Infrastructure and Water Management/Rijkswaterstaat), the EU projects, the TKI projects (Top Consortiums for Knowledge and Innovation) and, last but not least, the national and international market activities. This development was an explicit focus in 2018 and it will continue in 2019.

Focus areas

The Nature-Based Flood Defences, Multiresolution Modelling and Climate Adaptation focus areas reached successful



completion in 2018. At least two new focus areas – *Water and Security* and *Water and Health* – will be on the programme for 2019-2021.

Water and Security looks at the extent to which water and water scarcity play a role in conflicts and migration, how they can be forecast better when we use information about water, and how improvements in the management of that water, or other interventions, can be helpful.

The aim of *Water and Health* is to investigate whether health can be improved by forecasting the risks and spread of diseases through water systems. And whether we can reduce health risks through the targeted design of, and water management in, urban and rural ecosystems. Enhancing our knowledge in both areas is possible only by drawing on a wide range of scientific disciplines. These focus areas therefore involve bringing together a national and international research community.



Deployment of knowledge resources

State-of-the-art knowledge resources are crucial for the strengthening of our national and international position. We take these resources to include: software, tools, facilities and, emphatically, the relationships between them. In early 2019, we will identify the knowledge resources that are important in terms of the leading areas, both nationally and internationally, where Deltares wishes to be an acknowledged name. We will be making further investments in the ongoing development of these resources in 2019 and the years thereafter.

We root our knowledge resources, including the facilities, in the knowledge strategy. We determine what we want to do, and where and how we do it. In this way, we strengthen the relationship between knowledge objectives, knowledge resources and regions. In 2019, we will draw up a 'foresight' of the experimental arrays required during the planning period, describing the facilities and/or functionalities in place that are crucial for knowledge development and those that we need to add.

We also look at the facilities and/or functionalities that are no longer needed for the knowledge strategy and that therefore require another business model or that can be divested.

Strengthening cooperation with other research institutions, nationally and internationally

Universities and other research organisations are important partners for us. We draw on universities for new knowledge in terms of both



ideas and people. We share employees extensively: from professors to doctorate and undergraduate students. A healthy relationship with the universities that are relevant for us will therefore continue to be just as important in 2019.

Given the fact that the major challenges facing society increasingly require an integrated, interdisciplinary approach, cooperation with fellow research institutes has continued to increase in recent years. At the national scale, this is the case for our fellow TO2 institutes for applied research and the National Research Institutions (RKIs). In concrete terms, this cooperation involves research in the field of the energy transition with TNO/ECN, in the field of climate change and the associated impacts with the KNMI, in the field of agriculture, water, water

quality and food with the WUR and the RIVM, and in the field of infrastructure with TNO and MARIN.

International strategy: focus by region

We elaborated our international strategy in 2018, introducing a focus for each region and further refining our marketing approach. We will not be making any new decisions about the market strategy in 2019. The outlines have been set out in the Strategic Agenda, and they are stated as action plans for the individual regions for 2019. This process takes place in and with the units and departments. The IBIS team (International Business development - Information and Support) supports the units and departments during the drafting of proposals and with strengthening customer relations. We will be working more than in the past on the

basis of the principle 'structure where needed and freedom to manoeuvre where possible'.

Developing international cooperation requires a lot of time and energy. We therefore need to select a limited number of strategic partners with whom we will actually work together in intensive ways. We are committed to strengthening the relationships with our long-term partners such as NUS (National University of Singapore), TWIG (Water Institute Louisiana) and PusAir (Indonesia). We will also draw on the recommendations from our International Advisory Board to develop strategic partnerships further.

We will continue with our present market strategy. There is an extra emphasis on the link with the knowledge strategy, with new initiatives to transfer knowledge to the market faster. We

do this by strengthening the connection between major projects and programmes, by guiding enabling technologies towards business propositions, and by participating in a start-up accelerator for smart cities. In 2019, we will also be strengthening the connections between our knowledge development and the major international projects. We are adopting Manila Bay as a concrete international project that will also allow us to assess our knowledge development. The first pilot project was initiated here in 2018: what is the significance of our knowledge development for this project and what is the significance of this project for our knowledge development? The project will result in concrete knowledge and tool development in 2019, driven not only by the project but also by our knowledge agenda. The aim is to increase our impact. Our aim is to do the same thing for other major foreign projects in 2019.



Actions

- Strengthen the link between our knowledge and market strategy by formulating our research on more 'mission-driven' lines. The SDGs play a prominent role here;
- We will be going ahead with our focus on enabling technologies (*DigiShape* and start-up accelerator *Smart Cities*);
- Clear choices relating to the ongoing development of our most important knowledge tools (software, tools, facilities). Improving the rooting of our knowledge goals for each programme in knowledge resources. Foresight covering required experimental knowledge resources in the near future;
- Two new focus areas: *Water and Security* and *Water and Health*;
- Strengthen the link between our knowledge development and major international projects.

CHAPTER 3



People, facilities and software



Our people make Deltares

The most distinctive characteristic of Deltares is our talent, our employees. It is therefore vital to focus on their development. Both for our employees themselves and for our clients. Attracting new talent will again be a top priority in 2019 in order to achieve the required increase in the number of employees. At present, we primarily have a shortage of people with IT, data and monitoring in their DNA. The strategic HR priorities are therefore: 'finding and connecting talents' and 'talent development and sustainable employability'.

The identification and retention of talent

To attract new talent, Deltares will be present at various university events in 2019. We do this with the Deltares recruitment team, which consists of colleagues from all units. We also organise an in-house day specifically for software engineers/data scientists. We invest in the online positioning of Deltares by further professionalising our website and by using social media. We also continue to use the network of our own employees. This would already seem to be resulting in the recruitment of a number of genuine top talents in our field in early 2019.

'Learning from each other'

Finally, in 2019, we will be looking more closely at how we can recruit more starters from our trainee pool and how we can strengthen our network with our university contacts.

Talent development and sustainable employability

Young Professional Programme

Deltares will be organising the Young Professional Programme for the first time in 2019 for our junior consultants/researchers. Deltares wants to provide our starters with adequate guidance to ensure that they receive the best possible support in their personal and professional development, and that they get to know the Deltares organisation well and learn from each other. The programme consists of seven modules that focus on, among other things, increasing personal effectiveness, dealing with work pressure, working on a project basis, intercultural collaboration and entrepreneurship. In addition, we offer mentoring, intervision and an online learning environment.

Development of employees and managers

Managing excellence, developing the leaders of the future and continuing to develop the knowledge and skills of our employees are therefore crucial to achieving our knowledge ambition. We will also be investing in the development of our top talent in 2019. This generally requires a tailor-made approach. A lot is possible at Deltares and we have a large range of courses, development and supervision options. In addition, we are continuing to invest in the development of our managers so that they can facilitate the development of their employees as well as possible.

2019 Staff Survey

We will be conducting a Staff survey in 2019 so

that we can establish a picture of job satisfaction, commitment and motivation among our workforce and find out what they think about their working environment and their work as such. As in 2017, we will be discussing the results down to the department level and ways to make improvements will be agreed on and implemented.



Actions

- Recruitment: invest in recruitment in the light of the Deltares growth ambition, targeting, among others, starters from trainee pool, events, upgrading university contacts and online positioning;
- Young Professional Programme: develop and implement a two-year programme for junior consultants/researchers at the outset of their careers. Two groups of twelve participants to start with;
- Talent management: plan to provide the best facilities for the development of our top talent;
- 2019 Staff Survey: conduct staff survey, discuss results down to the department level and implement improvements at the Deltares, unit and department levels.

Coordination of physical facilities

Deltares has extensive in-house resources for experimental research (facilities, labs, fieldwork) in the area of water and the subsurface. Experiments are crucial in order to understand processes and generate datasets for the validation of software and a generic knowledge base. However, we are not yet using the Delta

facility optimally in the knowledge cycle. This area merits more attention from all employees.

We are fully engaged in achieving more synergy in the areas of technical support and measurement & monitoring, and also in terms of developing instruments. By combining knowledge and capacity we achieve greater flexibility and better quality. Given this objective, the applied geology and geophysics monitoring club (TGG) shifted the focus of its operations from Utrecht to Delft in mid-2018. We are working together on setting up a new working environment in the Hydro Hall. In 2019, in addition to the workshop and storage/set-up area, we will be creating a development area as a basis for co-creation and innovation with Deltares academics and PhD students from inside and outside Deltares. This process will also involve looking at the group dynamics of this Deltares-wide venture and putting external coaching and supervision into place.



Actions

- Ongoing development of vision of measuring/monitoring;
- Establish new working areas and development areas in line with the detailed vision;
- Increase awareness of experimentation possibilities among all employees, new and old;
- Generation of group dynamics (with external coaching) in order to establish high-quality, compact, disciplinary training in our own network.

Datasets for validation of software

The pilot projects will be launched in 2018 with the aim of establishing a picture of how we can integrate experimental data in a generic database as the basis for new knowledge development and the validation of software. We will complete these pilot projects in the first quarter of 2019. We will share the 'lessons learned' to make possible the broader implementation of data generation and storage for software validation and knowledge development. Studies have shown that the current methods and storage methods limit re-use options. Moreover, they are focused on individual projects, which means that opportunities for building cross-project knowledge remain unused.

Precisely because Deltares has adopted the goal of delivering undisputed knowledge, it is essential for data exchange to meet the FAIR principles (Findable, Accessible, Interoperable,

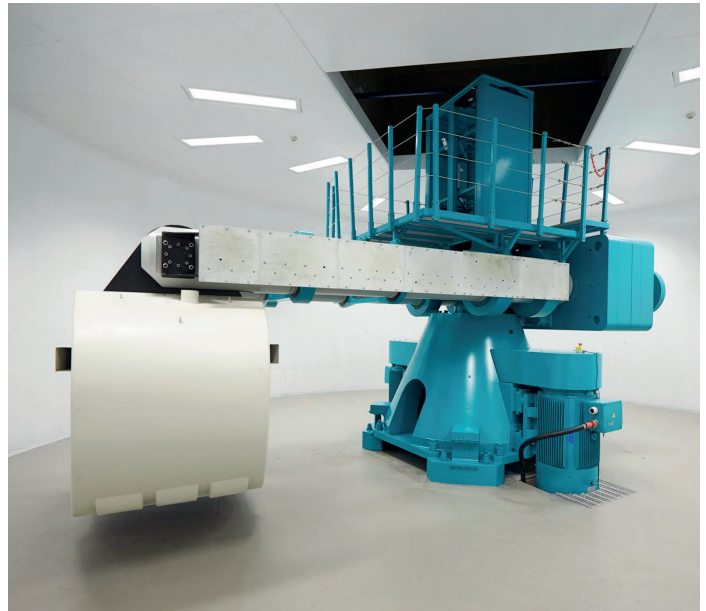


Re-usable). In this way, Deltares complies with the Dutch code of conduct for scientific integrity (2018). With respect to the duty of care, this code of conduct devotes a section explicitly to the sustainable storage and accessibility of data, software code, protocols, research material and accompanying metadata. This furthers the quality of research by enabling collaboration, both interdisciplinary and between universities, research institutions and community stakeholders at the national and international levels. We want to make further improvements in 2019 as well. We also use the 'lessons learned' to make possible the design of data generation and storage for the Geocentrifuge prior to execution/ implementation.



Actions

- Broader implementation of data generation and storage for software validation and knowledge development;
- Optimise the working methods in the experimental facilities (including Delta Flume and Geocentrifuge) for the purposes of re-use;
- Use the 'best-of data' to establish a number of validation sets/test bank sets that we can use for new model releases.



Geocentrifuge

Agreement was reached in 2018 with the Dutch government about joint financing for a new Geocentrifuge. In the next phase, a European tender procedure was initiated and, insofar as external parties were involved, that procedure has now been completed. Construction work on the new Geocentrifuge will begin in 2019 and continue until the end of 2020. Work will begin in 2019 on the development of the software (integration) for operating the centrifuge, and data acquisition and processing. We will be setting up a flanking research programme and entering into alliances with Delft University of Technology and international partners such as IFSTTAR (a French scientific institute in the field of transport and networks) to ensure that research gets off to a flying start after the completion of the Geocentrifuge.



Actions

- Complete construction and software development for the Geocentrifuge according to plan;
- Establish a flanking research plan and alliances for Geocentrifuge research.

Software

Software is an important knowledge carrier for Deltares. Firstly as an experimental environment where we try out new developments and concepts in research projects. Secondly as a robust set of instruments that we can use for integrating tested and documented functionality and for official releases. Financing in this area comes to a major extent from collaboration projects with, among others, the business community. In the

case of existing software: maintenance and ongoing development with the aim of maintaining and expanding our position for the years to come.

Keeping existing software up and running, and ongoing development, are becoming increasingly complex in terms of both content and process. That is true of all major packages and systems, such as the D-GEO Series, FEWS and Imod. In cross-unit terms, a major priority is the D-HYDRO Suite, which is one of the core cornerstones of the international Deltares position, also given the national importance of this software in the primary Rijkswaterstaat process.

The *Enabling Technologies* theme focuses on the new generation of tools and working methods. In 2019, we will establish a better picture of the

extent to which some of these new data-driven tools, such as those based on Earth Observation, have the potential to result in breakthroughs in the long term that will have consequences for our software development strategy.



Actions

- Establish long-term plans (road maps) for functionality in the software;
- Increase the necessary financing for ongoing development;
- Increase the effectiveness of maintenance and development processes;
- Foresight study looking at the potential of 'data-driven' technologies.



CHAPTER 4



Organisation



Communications

How can we increase the communicative power of Deltares? We want our communications strategy and resources to contribute to knowledge sharing, to strengthen our innovative image and to reinforce our position as a thought leader. Important priorities in the communications strategy in 2019 will, in line with the Deltares focus, be our international position and profiling for new employees.

The most important factor determining the Deltares image is the workforce itself. In 2019, we therefore propose to continue our efforts to

'Communication in the heart of projects'

improve everyone's communications skills by means of personal coaching and courses. We will continue working on a pro-active communications policy and put the facilities in place to ensure that communications are at the heart of our policy and projects.

In view of the large number of subjects involved, we will continue to introduce a sharper focus. In the stories we share with the outside world, with which our colleagues must also be able to identify, we emphasise the impact on society as a whole. We will structure communications more systematically so that we can re-use content more often.



Actions

- Content strategy (focus on communications dossiers in content calendar/resources);
- Revitalise corporate identity (especially for employee facilities) and corporate communications resources (such as brochures, films);
- Strengthen employee communication skills with courses;
- Strengthen our contribution to international positioning and profiling, and employer branding.

ICT

In 2019, we will continue to develop the agile, secure and professional IT organisation for Deltares by implementing the IT strategy that was launched two years ago. We will also continue to work on our high-end IT infrastructure for computing and data processing. Our 'private' cloud will be extended in 2019.

This will allow us to deliver a faster and clearer IT infrastructure for the operational systems (FEWS). We will also use this technology as the basis for a pilot project to prepare for the replacement of the Linux computing cluster. In 2019, we will collaborate with the other TO2 institutes on an exploration of the options for working with Surf (ICT cooperation organisation for education and research in the Netherlands).

The first steps were taken on the Cirrus project in 2018: a 'workplace' with new laptops hosting Office 2016 and Windows 10. All other colleagues (more than 700) will switch to the new working

environment in the first quarter of 2019. In the remainder of 2019, we will be working closely with the organisation to roll out more new functionalities in phases. Examples are project mailboxes and ways of making it easier to work on a document in the context of a project (source document with version management). The aim is to make it easier to work in teams both inside and outside the organisation.

Cyber security will continue to be an important issue in 2019. It requires, on the one hand, extensive integrated monitoring to detect and ward off any threats. On the other hand, we are committed to making Deltares more resilient so that the impact of any security incidents can be minimised.



Actions

- Extension of private cloud (OS cluster, H7 pilot);
- Explore ways of working with Surf in collaboration with TO2;
- Roll out new workplace (Cirrus);
- Cyber security: implement integrated monitoring and increase the resilience of the organisation.

Learning Organisation & Information Management

We want to be a learning organisation and to think about how we learn and how our processes work. Information management helps to optimise collaboration inside and outside the organisation and it therefore supports our efforts to work as a learning organisation. In 2019, Deltares will focus on improving the use/re-use of available informa-

tion and/or knowledge inside the organisation. In order to achieve this, we will be simplifying information supply as much as possible to support the primary processes. We will also be deploying tools that simplify collaboration, both inside the organisation – in other words between units and support departments – and outside it. We are also investing in an environment that will help users to search and find information in straightforward ways, regardless of the information system housing that information. This will provide access to best practices and lessons learned so that they can be re-used. Finally, we will be establishing close links between access to information and the roles of people in the organisation.



Actions

- Establish access to best practices and lessons learned;
- Work on a single search portal for all information at Deltares;
- Implement information management, including linking access to information to roles in the organisation.

Facility management

After almost ten years, most of the work on the campus in Delft will be completed in 2018. The remaining work for 2019 includes: the relocation of the workshop, the construction of the Geo-centrifuge and the completion of work on the area on the south side.

In Utrecht, the Daltonlaan offices will be extended to include an extra rented section on the second

floor. And we will be creating a secure area in the car park for the borehole drilling truck and associated equipment.

On the way to being energy- and carbon-neutral

Our environmental objective, as stated in our CSR policy, is that Deltares intends to be energy- and carbon-neutral in 2050. This target complies with the E-deal with the City of Delft. In the context of the energy transition and the reduction of carbon emissions, we are mapping out the present levels of energy consumption in our test facilities and offices. That transition includes the statutory requirement to have an energy label C in 2023 and label A in 2030. On the basis of this review, we are proposing a long-term plan containing a range of measures, including the prioritisation of, and budgeting for, the reduction of our carbon emissions.

We now have more than 9000 solar panels on the Hydro Hall and Geo Hall. We will be installing more in 2019 on the low-rise sections of the Tower and the bike shelter. Individual users continue to have a major role in terms of how much energy is consumed. We aim to continue work on raising awareness in this respect. We will therefore be entering into a dialogue with everyone working for Deltares so that they are aware of how energy is wasted and how they can help to reduce our footprint. We will also be asking our suppliers and contractors to work with targets.

Our flights for business purposes generate carbon emissions of more than 2000 tons annually. We have therefore launched a carbon awareness initiative and the results should become apparent in 2019.



Actions

- Survey of energy consumption in buildings and energy 'mirror' to inform employees about energy consumption and waste;
- Supplier/contractor day with strategic suppliers and contractors to draw up targets for innovation, safety, sustainability and inclusiveness;
- Ongoing roll-out of the carbon awareness project and communication of results.

Finances and control

We will be making a close scrutiny of our current financial processes and legal support. We will be using a process optimisation approach, lean six sigma, to determine where they can be more efficient and effective. This is a method we intend to use continuously in order to take a critical look at ourselves and the processes. Do we do everything in the most effective way? This approach makes it possible to introduce continuous improvements into our DNA. We do this in collaboration with the units: where are the points of friction and the energy drivers so that we can take steps together to improve financial processes and legal support at Deltares?



Actions

- We will assess the financial processes in a range of workshops so that they can be optimised for the organisation.
- We will make legal support more efficient.

CHAPTER 5



Budget



General

The goal for the net result in 2019 is €2,15 million. The net revenue will increase by comparison with the budget for 2018 as a result of more strategic research funding from central government. The gross margin will not increase as quickly because there will be more outsourced work.

There will be a relative increase in revenue from the Netherlands in 2019 as a result of the increase in the funding for strategic research. The expected level of international revenue is expected to match 2018. International project revenue is expected to increase to €36.5 million in 2019.

Salary expenses and social security charges will rise by 2.5% in 2019. Inflation in 2018 was 2%. Rates will therefore rise by 2.5% in 2019. Total costs, excluding salaries, will increase slightly, mainly due to higher energy expenses, by comparison with 2018.

Income statement

INCOME STATEMENT (x € 1,000)	A Budget 2019	B Forecast 2018	C Budget 2018	A-B Result effect	A-C Result effect
INCOME					
Net revenue	117,600	113,500	106,550	4,100	11,050
Cost of subcontracted work	-15,000	-15,000	-10,200	0	-4,800
Gross margin	102,600	98,500	96,350	4,100	6,250
CHARGES					
Wages and social security	-71,700	-68,400	-67,300	-3,300	-4,400
Other staff expenses	-10,500	-10,700	-10,100	200	-400
Depreciation of tangible assets	-6,400	-5,850	-5,900	-550	-500
General expenses	-11,100	-10,350	-10,200	-750	-900
Total operating expenses	-99,700	-95,300	-93,500	-4,400	-6,200
Operating result	2,900	3,200	2,850	-300	50
Financial income and expenses	-750	-1,100	-850	350	100
Net result	2,150	2,100	2,000	50	150
Average number of FTEs	775	765	755	10	20
% billable hours	54.2%	54.3%	54.1%	-0.1%	0.1%

KEY FIGURES INCOME STATEMENT					
Wages and social security per FTE	92.5	89.4	89.1	3.1	3.4
Gross margin / staff expenses	1.43	1.44	1.43	0.0	0.0
Net revenue per FTE	151.7	148.4	141.1	3.3	10.6
Gross margin per FTE	132.4	128.8	127.6	3.6	4.8
Net result per FTE	2.8	2.7	2.6	0.0	0.1

The financial income and expenses consist primarily of the interest on the mortgage. Exchange rate differences have not been taken into account.

Net result

Per unit

The comparison of the net result by unit for 2019 with the budget and the end-of-year forecast for 2018 results in the following picture.

Net result before taxation (x € 1,000)		Budget for 2018				
Unit	Description	Facilities 2019	Research 2019	Budget 2019	Forecast 2018	Budget 2018
ZWS	Inland water systems		2,300	2,300	1,930	1,630
ZKS	Marine and Coastal Systems	-280	1,060	780	1,430	1,170
BGS	Subsurface and Groundwater Systems	-680	730	50	-80	120
HYE	Hydraulic Engineering	-1,680	1,880	200	180	270
GEO	Geo-engineering	-430	1,170	740	1,140	1,040
DSC	Deltares Software Centre		-1,170	-1,170	-1,100	-1,100
OA	Support Departments		-750	-750	-1,400	1,130
Total		-3,070	5,220	2,150	2.10	2,000

DSC booked a negative net result due to the costs for the management and maintenance of software. The negative amount for the support departments relates to financial income and charges.

Revenue per unit and the FTEs per unit are shown below.

Net revenue (x € 1,000)		Budget 2019	Forecast 2018	Budget 2018	FTEs
Unit	Description				
ZWS	Inland water systems	33,500	31,650	29,400	168
ZKS	Marine and Coastal Systems	19,050	19,400	17,900	121
BGS	Subsurface and Groundwater Systems	21,950	20,370	18,700	113
HYE	Hydraulic Engineering	15,900	16,120	15,500	95
GEO	Geo-engineering	21,050	21,395	19,100	99
DSC	Deltares Software Centre	6,150	4,425	5,700	66
OA	Support Departments		55	250	113
Total		117,600	113,415	106,550	775

Per support department

The operating results for the support departments total -€27.7 million. This is €2.5 million less than in 2018. A change in the system accounts for €1.5 million of this amount: the marketing expenses and the expenses of internal knowledge development projects have been budgeted centrally under 'generic unit expenses'. Previously, these expenses were stated for each unit. They will be passed on to the units in 2019 using the overhead allocation key.

Operating result for support departments (x € 1,000)		Budget 2019	Forecast 2018	Budget 2018
Unit	Description			
ICT	Information and Communications Technology	-7,900	-7,020	-7,100
FAM	Facility Management (including real estate)	-9,180	-8,800	-9,000
HRD	Personnel & Organisation	-1,920	-1,730	-1,900
FNC	Finances & Control	-4,340	-4,120	-4,100
COM	Communications	-1,330	-810	-1,200
MGM	Management	-1,330	-1,520	-1,700
OV	Other administrative expenses	-1,700	-1,670	-200
Total		-27,700	-25,670	-25,200

Income

Revenue

Budgeted revenue is expected to come from the following sources:

Revenue distribution for Deltares (X € 1,000)	Budget 2019		Budget 2018	
Demand-driven research (SO / KPP)	43,600	37%	35,000	31%
Netherlands	38,000	32%	35,050	35%
Total Netherlands	81,600	69%	70,050	66%
International	36,500	31%	36,500	34%
Total, international	36,500	31%	36,500	34%
Total	118,100	100%	106,550	100%

Charges

Staff expenses and temporary employees

The budget assumes an increase in wages in accordance with the national collective labour agreement. Pension expenses have been increased in accordance with the new premiums as issued by the pension fund.

Staff expenses (x € 1,000)	A Budget 2019	B Forecast 2018	B Budget 2018	A-B Result effect	A-C Result effect
Wages	56,250	53,800	53,260	2,450	2,990
Social security	6,500	6,510	6,040	-10	460
Pensions	8,950	8,090	7,990	860	960
Wages and social security	71,700	68,400	67,290	3,300	4,410
Temporary employees	3,550	4,120	3,450	-570	100
Travelling and accommodation expenses	2,850	2,820	2,990	30	-140
Catering expenses	650	690	650	-40	0
Training and educational expenses	1,100	980	1,160	120	-60
Other expenses and provisions	2,350	2,090	1,850	260	500
Total other staff expenses	10,500	10,700	10,100	-200	400
Total	82,200	79,100	77,390	3,100	4,810

General expenses

General expenses are higher than the budget for 2018. The increase can be attributed to higher housing expenses as a result of higher energy rates. In addition, the consultancy expenses are higher for, among other things, the foreign branches (for tax purposes). The amount in the 2018 budget proved to be too low.

General expenses (x € 1,000)	A Budget 2019	B Budget 2018	A-B Result effect
Housing expenses	2,850	2,650	200
Automation expenses	2,950	2,800	150
Office expenses	700	700	0
Sales expenses	1,000	1,000	0
Plant and machinery	850	800	50
Consultancy expenses	1,650	1,200	450
Insurance	500	500	0
Car expenses	250	250	0
Other general expenses	350	300	50
Total	11,100	10,200	900

Investments

A distinction is made in investments between the regular investments and project-based investments. The regular investments are estimated at €5.65 million. The investment for 'Housing' relates primarily to major maintenance work. 'Automation' relates to the replacement of old laptops, and the roll-out of Office 365 and Windows 10. In addition, investments will be made in the upgrading of the computing cluster.

The project-based investments in 2017 relate to investment in a new Geocentrifuge and the completion of the campus development (final phase of site development, the relocation and demolition of the workshop, and renovation of the south side of the Hydro Hall).

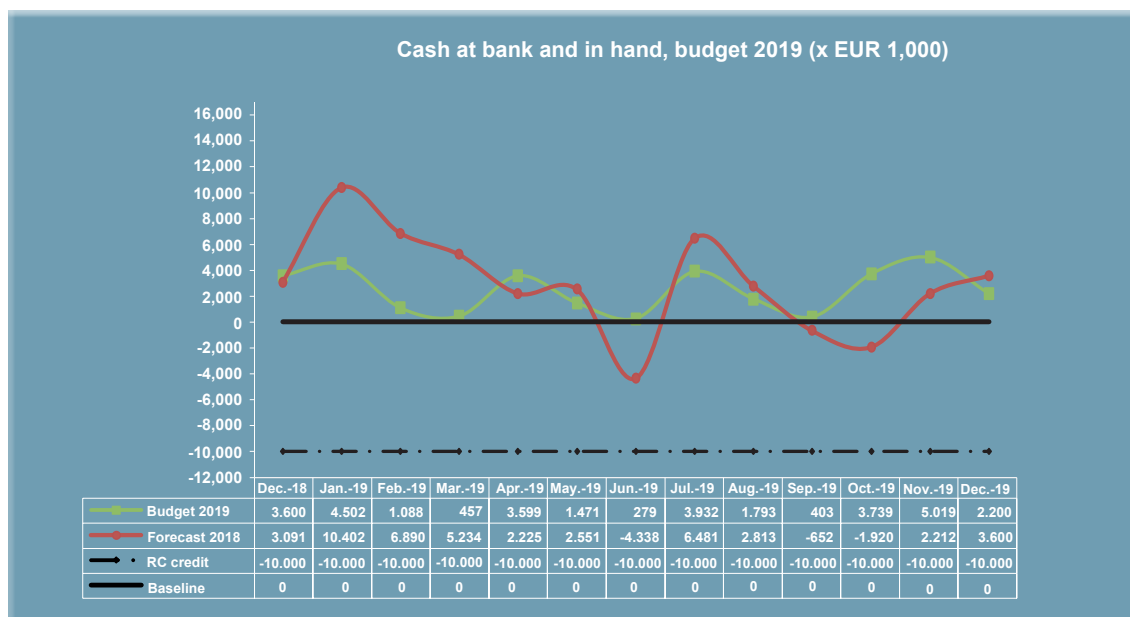
The investment in the Geocentrifuge accounts for a total of €6.2 million. Half of the funding for this investment comes from an outside subsidy. The other half comes from our own resources involving the use of extra credit. This investment began in 2018 and the Geocentrifuge will go into operation in 2020.

The other investments are financed from our own resources.

Investments (X € 1,000)	A Budget 2019	B Forecast 2018	C Budget 2018
Housing	1,100	500	1,200
Facilities and instruments	850	300	700
Automation	3,700	3,100	3,300
Sub-total regular	5,650	3,900	5,200
Campus development	1,800	2,200	2,900
Geocentrifuge	4,000	200	1,500
Sub-total project-based	5,800	2,400	4,400
Total	11,450	6,300	9,600

Cash position

The cash position is shown in the graph below. Cash at bank and in hand is expected to be more than €2 million at year-end 2019



The changes in the cash position are set out in the table below showing the sources and deployment of resources.

List of sources and deployment of resources

It is expected that cash at bank and in hand will fall by €1.4 million. This is mainly because the investments exceed depreciation and will be fully financed from the cash flow from operating activities.

The interest charges (€0.75 million) for the long-term loan have been included under the financial commitments because of the financing for the new buildings. In addition, the standard repayments (€400,000) have been included, together with a maximum additional repayment of approximately € 1.1 million.

List of sources and deployment of resources (x € 1,000)	Budget 2019
Result after taxation	2,150
Net interest charges	750
Net operating result	2,900
Depreciation	6,400
Cash flow from operational activities	9,300
Change in net working capital	2,000
Available cash	11,300
Net interest charges	-750
Long-term loan repayments	-1,500
Financial commitments	-2,250
Available for investment	9,050
Capital expenditure on tangible fixed assets	-11,450
Investments in campus development	0
Investments	-11,450
Requiring financing (if negative)	-2,400
Financing of loan	1,000
Financing activities	1,000
Change in cash at bank and in hand	-1,400
	Cash at bank and in hand
Cash at bank and in hand as at 1 January	3,600
Change	-1,400
Cash at bank and in hand as at 31 December 2019	2,200

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