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Bundesministerium  
für Bildung  
und Forschung

# Review of activities under the Germany–New Zealand Science and Technology Cooperation Agreement



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Ministry of Research, Science and Technology

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## **1) Summary of Contents**

### **2. Introduction (P. 6)**

New Zealand and Germany signed a Science & Technology Cooperation (STC) Agreement in 1977 to “facilitate and encourage scientific and technological cooperation for peaceful purposes between civilian agencies and organisations in the public and private sectors of each country”.

In 2006, the respective implementing agencies for the respective countries – the German Bundesministerium für Bildung und Forschung (Federal Ministry for Education and Research – BMBF) and the New Zealand Ministry of Research, Science and Technology (MoRST) – agreed to review how the arrangement has been implemented.

This Section outlines:

- the objectives set for the Review; and
- how four case studies (along with an associated survey) were used to meet these objectives.

### **3. The STC Agreement in the wider bilateral context (P. 8)**

This Section briefly documents how and why both countries see science linkages as a positive contribution to the broader bilateral relationship.

### **4. History – Key events 1977–2006 (P. 9)**

This Section focuses on the significant number of visits and other activities that have taken place (particularly over the last decade) to strengthen the bilateral research relationship.

### **5. Bilateral activities since 2000 (P. 11)**

This Section describes how bilateral science linkages are supported in both countries by RS&T sector organisations and activities. The description of these is supported by examples of ‘success stories’.

In Germany support mechanisms include:

- the International Bureau of the BMBF (IB–BMBF);
- an IB–BMBF Coordinator;
- the German Embassy in New Zealand;
- the Federal Ministry of Food, Agriculture and Consumer Protection;

- the Alexander von Humboldt Foundation (AvH); and
- the German Science Foundation (DFG).

In New Zealand bilateral science linkages are supported through:

- RS&T cooperation initiatives supported by MoRST;
- a New Zealand-based Coordinator;
- the New Zealand Embassy in Berlin;
- the MoRST/Royal Society of New Zealand (RSNZ) travel grant programme;
- MoRST-ISAT DFG programme;
- Julius von Haast Fellowship (JvH); and
- 'mainstream' funding of collaboration – through the likes of the Foundation for Research, Science and Technology (FRST), the Health Research Council (HRC) and the Marsden Fund.

## **6. Case studies (P. 29)**

Four case studies and survey work was carried out with scientists in both countries, looking at:

- how the various activities have contributed to STC Agreement objectives;
- the benefits arising from the relationship;
- how the relationship developed over time;
- the interventions, initiatives and key activities that contributed to the success of the relationship; and
- what barriers to a successful relationship arose, and how these were overcome.

The four case studies discussed and analysed in this Section are:

- Industrial Research Limited (IRL)'s work with the German Aerospace Agency (DLR) and other German agencies on high temperature ceramics;
- the National Institute for Water and Atmospheric Research (NIWA)'s climate change collaborations with German universities, Max Planck Institutes and National Research Centres;
- AgResearch's work with the Research Institute for the Biology of Farm Animals (FBN) on bovine molecular biology and other pastoral research; and
- the University of Auckland (UoA)'s Department of Chemical and Materials Engineering collaboration with Prof Hans Müller-Steinhagen of the DLR Institute for Technical Thermodynamics, and the Institute of

Thermodynamics and Thermal Engineering, University of Stuttgart, (UoS) on “Coatings for Lightweight Bipolar Plates for Solid Polymer Fuel Cells”.

### **7. MoRST/BMBF analysis of the relationship (P. 37)**

This Section ‘steps back’ to look at the relationship from a wider perspective. It looks at the following aspects of that bigger picture:

- the Mutual Benefits – in terms of direct science benefits;
- the depth and breadth of New Zealand–Germany research linkages;
- the large number of New Zealand and German contributors to activities under the Agreement – and how this can lead to complexity; and
- the value of coordination – and what MoRST and BMBF need to do to ensure that promising research collaborations are realised.

### **8. The European Union connection/synergies (P. 41)**

Germany’s endorsement for the European Union (EU)’s objectives (mandated through the Lisbon Strategy), and that Strategy’s similarity to New Zealand’s own Economic Transformation (ET) Agenda are discussed. The synergies are then developed between research topics in which the New Zealand Government chooses to invest, and the EU’s 7<sup>th</sup> Framework programme for Research and Technological Development (FP7).

These synergies are explored in terms of:

- what this means for an EU/New Zealand STC Agreement;
- Facilitating Research cooperation between Europe and New Zealand (FRENZ) – an initiative to help engage New Zealand research organisations and researchers with FP programmes and other EU opportunities; and
- four research areas of particularly strong New Zealand–EU interest are identified.

### **9. Benefits from focusing Government initiatives (P. 46)**

This Section briefly describes the six science areas identified as being those in which BMBF and MoRST see maximum mutual benefit from cooperating.

### **10. Recommendations (P. 47)**

Fourteen specific recommendations are made (based on MoRST/BMBF meetings in March 2006) in the following areas: Information; Priority science areas; Linkages programmes; Government level linkages; and other initiatives.

## 2) Introduction

New Zealand and Germany signed a Science & Technology Cooperation (STC) Agreement in 1977 to “facilitate and encourage scientific and technological cooperation for peaceful purposes between civilian agencies and organisations in the public and private sectors of each country”. The text of the Agreement is Appendix 1 of this report.

Over the past 29 years, no formal Government-level survey of the STC Agreement has taken place. Therefore, in 2006, the respective implementing agencies – the German Bundesministerium für Bildung und Forschung (Federal Ministry for Education and Research – BMBF) and the New Zealand Ministry of Research, Science and Technology (MoRST) – agreed, under Article 9 of the STC Agreement, to review how the arrangement has been implemented.

They also agreed, under Article 2.1 of the STC Agreement, to identify priority areas for cooperation, towards which Government initiatives and programmes should be targeted. In addition to identifying priority areas, consideration would also be given on how best to promote and implement this cooperation.

### Objectives for the Review

MoRST and BMBF agreed that the review of the STC Agreement should:

- survey the range and depth of recent (since 2000) and current collaborative initiatives and linkages;
- focus on the key determinants of successful collaborative projects and identify obstacles to better linkages; and
- identify ways to strengthen linkages.

They also agreed that because both countries are keen to foster research as a major driver of innovation, the initiatives undertaken by Government agencies to support the STC Agreement should be orientated towards mutually important key science areas with notable innovation potential.

## Process

The 2001 PricewaterhouseCoopers' review of *New Zealand Activities Undertaken in Support of the Science and Technology Cooperation Agreement between New Zealand and Germany* has been taken as a starting point. Its broad conclusion – that the activities undertaken in relation to the STC Agreement have been successful and have added value to the New Zealand research, science and technology (RS&T) sector – provided a positive base for the current review.

MoRST and BMBF obtained data from German and New Zealand funding agencies, as well as from their own records, on the research-related activities taking place under the STC Agreement. This data was then analysed to identify the science areas in which research collaboration is currently most common, and to identify significant trends and activities falling within the ambit of the Agreement.

MoRST and BMBF also undertook four case studies in science areas with direct economic and/or explicit public benefit. The objective of these case studies, (beyond profiling successful mutually beneficial projects) was to identify why and how they succeeded, particularly looking at German and New Zealand agencies' interventions which have played a useful part. The case studies involved completion by the New Zealand researchers of a survey, supplemented with data from New Zealand funding agencies. This was followed up, in March 2006, by interviews undertaken jointly by MoRST and BMBF officials.

In March 2006, BMBF and MoRST senior officials met in Wellington, New Zealand to discuss the review's progress and to identify possible initiatives which could be taken to enhance collaboration.

### 3) The STC Agreement in the wider bilateral context

New Zealand–Germany science linkages contribute positively to the broader bilateral relationship. Science collaboration, built as it is on person to person connections, is generally seen as being politically neutral and it can provide a pathway for trade and other linkages. This beneficial outcome has been well recognised by the New Zealand and German governments, as the following statements from the respective foreign Ministries reflect:

*“The Germany–New Zealand Science and Technology Cooperation Agreement is the framework within which the German and New Zealand governments promote collaboration by our respective scientific communities. These scientific links constitute one important strand of the broader bilateral relationship, alongside our trade and economic, social and cultural, and people-to-people links.*

*The STC Agreement has led to a robust and developing RS&T relationship between New Zealand and Germany at several levels which are key to the growth of knowledge in a global economy.”*

**New Zealand Ambassador to Germany, August 2006**

*“The cooperation with New Zealand shall give additional input for German research activities in national prioritised areas, shall give access to human resources in science and should be used as demonstrator for German technology. One quite visible indicator for the value of New Zealand researchers and research institutes as partners for Germany are the success rates of New Zealand applicants within the excellent fellowship program of the Alexander von Humboldt Foundation.”*

**BMBF 2006**

#### 4) History – Key events 1977–2006

Bilateral science relations developed steadily for the twenty years following the signing of the STC Agreement. The work of both New Zealand's and Germany's dedicated coordinators resulted in strong links in many disciplines, particularly environmental research and basic sciences. It was during this period that many of today's most valuable collaborations were established. The following table highlights a number of significant visits and other activities that have taken place in the last decade.

**Table 1: Key events 1977–2006**

<b>Year</b>	<b>Initiative/Activity</b>
1977	STC Agreement signed
1981	Special Antarctic STC Agreement signed
March 1997	Visit to NZ by Prof. Frühwald, President of the German Science Foundation (DFG)
September 1997	MoRST–DFG Agreement signed
May 2001	Opening of the German Academic Exchange Service (DAAD) Office at the University of Auckland
August 2001	PricewaterhouseCoopers' report completed
November 2002	German mission to New Zealand to celebrate the 25 <sup>th</sup> anniversary of the signing of the STC Agreement
	Research Vessel <i>Sonne</i> visits Wellington
February 2004	Visit of German President Rau to NZ
	First Julius von Haast Fellow appointed
	Regional Meeting of the Alexander von Humboldt Foundation (AvH) attended by AvH President Frühwald
April 2004	Establishment of MoRST Science Counsellor in the NZ Embassy in Brussels
July 2004	MoRST – AvH arrangement signed
April 2005	Prime Minister Clark meets Chancellor Schroeder in Berlin
March 2006	BMBF–led delegation (including IB–BMBF officials, representatives from other agencies and nanotechnology experts) visits NZ
June 2006	Signing of NZ Vice Chancellors' Committee – German University Rectors' Conference (HRK) Framework Agreement

There were also, between 1997 and 2006, many exchanges at official level. For example, Dr James Buwalda, then MoRST Chief Executive, visited Germany three times in the late 1990s for talks focusing on BMBF's Delphi forecasting initiative. Over the decade, New Zealand Coordinators for the STC Agreement made one or two trips per year to Germany for discussions with research funding and policy agencies, as well as visiting research institutes, to build project-specific linkages. German Coordinators have also visited New Zealand with similar agendas. Recent visits have seen the Coordinators accompanied by prominent researchers seeking to build collaborations in mutually important fields.

There have also been many exchanges at researcher, funding agency and institutional level. Among the most notable recent visits are:

- July 2004 Royal Society of New Zealand (RSNZ) Chief Executive Steve Thompson visits Bonn
- October 2004 HRK President Prof. Gaehtgens leads a delegation to New Zealand
- December 2004 Prof. Gruss, President of the Max-Planck Society, visits Auckland
- March 2006 Fraunhofer Institute Life Sciences Alliance chairman Prof. Uwe Heinrich visits New Zealand Biotech institutes and companies.

## 5) **Bilateral activities since 2000**

This section identifies the key German and New Zealand RS&T sector organisations and the activities they undertake to support bilateral linkages. All of these activities occur under the ambit of the STC Agreement. Appendix 2 provides a table of the bilateral science instruments of, and initiatives taken, by these German and New Zealand organisations.

### Germany

#### A) S&T Cooperation supported by the International Bureau of BMBF

Since 1996 German bilateral seed-funding activities have been supported by the International Bureau of the BMBF (IB-BMBF). There are three general pillars to BMBF's international linkages priorities:

- working with the world's best;
- supporting Small-and Medium-size Enterprises; and
- accessing resources.

Derived from the general BMBF pillars, New Zealand-German collaboration:

- facilitates linkages relevant to its own prioritised research topics, e.g. atmospheric and climate research or marine sciences;
- provides exchange possibilities to outstanding scientists from both countries, e.g. AvH and JvH Fellows;
- gives researchers access to unique locations and laboratories, e.g. cooperation with the Lauder atmospheric research station; and
- allows demonstration of German technology which consequently opens up economic links, e.g. cooperation with IRL or Auckland University in material research or with Agresearch in agricultural research.

IB-BMBF operates a mobility programme through travel grants that are awarded to researchers to travel to New Zealand.

The following science area categories used by the RSNZ in its analysis of travel grant applications are matched by the IB-BMBF programme:

- biochemical and biomedical;
- earth sciences and astronomy;
- life sciences;

- mathematical and information science;
- physical science/engineering; and
- environment.

Social sciences and humanities are not part of the BMBF funding scheme.

Five projects are funded every year by IB-BMBF (each of one to four years duration). Since 2000, BMBF has supported 25 bilateral projects. Specific science topics covered by currently active projects include:

- the use of microbial biosensors for measuring contaminants;
- molecular biology and in-vivo significance of the bacterial production of Lantabiotica;
- transport characteristics and mathematical modelling of quantum networks;
- molecular bioinformatics;
- exterior weathering of wood coatings in climates with different UV-intensities;
- sustainable use of sponges for the production of bioactive substances;
- workshop on nanotechnologies; and
- air pollution during inversion weather in Christchurch.

BMBF considers the collaborations supported over the past 29 years to have been valuable and productive, as documented by the Foreign Affairs Office biannual internal reports to the German government. These reports place the STC Agreement in a wider picture of German-NZ relationship and therefore gives BMBF a stronger mandate for its bilateral activities.

In addition to its mobility funding scheme, BMBF has also funded 'mainstream' bilateral projects: either directly with projects, or indirectly via institutional budgets of public research centres. One of the most visible and productive collaborations is featured in this section (see box on following page).

### **Success story: Ring Laser collaboration**

A wide range of New Zealand and German agencies have funded the long-lived and highly successful Ring Laser collaboration, in which researchers used a series of lasers, initially sited in the Cashmere Cavern, in Christchurch to investigate the variation of the rotational speed of the earth.

The ring laser gyroscopes directly and continuously measure the rotation rate of the Earth, which varies very slightly because the polar axis wobbles on time scale of a day due to the gravitational attractions of the sun and moon. These wobbles are the Oppolzer modes with amplitudes up to 20 milli-arcseconds (about half a metre on the surface). The rotation rate is measured with a precision approaching 10 parts per billion on these time scales. The elasticity and shape of the Earth and the fluidity of its core all affect the amplitudes, and so the measurements can be used to infer certain properties of the interior of the Earth.

These combined ring laser results were possible because of a collaboration of the Technical University of Munich, the University of Canterbury, Christchurch, New Zealand, and the Federal Office for Cartography and Geodesy based in Frankfurt.

The project grew from the initial contacts supported under the New Zealand travel grant programme into a substantial research collaboration of international significance. Major funders were the University of Canterbury's own research grants, the Marsden Fund and the DFG.

Following the success of the Canterbury ring laser experiment, the German Government agreed to fund a large ring project, valued at \$NZ19M at Wettzell in southern Germany. This ring is now operational. NZ researchers contributed to its design and have subsequently spent time at Wettzell helping develop improved methods of operation. The ring plays a part in a broad scientific programme that studies details of the way the Earth moves and rotates in space. Among other uses, it helps calibrate the position of the Earth relative to the set of satellites used in the Global Positioning Network.

## B) German Coordinator role and initiatives

The Asia and Oceania Unit in BMBF's Department of International Affairs is responsible for implementing the STC Agreement. The Unit has tasked the International Bureau (IB) of the BMBF at the German Aerospace Centre (DLR) with administering the STC Agreement and the associated mobility funding programme.

Dr Gerold Heinrichs is the IB Senior Scientific Officer responsible for coordinating these bilateral activities. As Coordinator, he advises BMBF in all matters relating to STC Agreement with New Zealand. His duties include: administering the BMBF-mobility funding scheme with New Zealand, reporting on the New Zealand science system to the German science community, collecting information about the other German cooperation schemes with New Zealand (DFG, BMELV AvH, DAAD etc.), and organising delegation visits and workshops. In all these tasks, Dr Heinrichs works closely with the New Zealand Coordinator. In March 2006 Dr Heinrichs planned and organised the largest delegation of German researchers and science administrators to ever visit New Zealand. The delegation visited research organisations to build linkages, participate in a nanotechnology workshop, and hold talks with New Zealand officials about opportunities for closer cooperation.

## C) German Embassy in New Zealand

The main task of the German Embassy in New Zealand is observing and reporting on New Zealand research policy and other science and technology sector developments. Their input ensures that science and technology is seen as a significant part of the wider economic and political linkages between the two countries.

The Embassy has also played a major role in directly supporting bilateral linkages. In 2002 the Embassy co-managed, with MoRST, a suite of events celebrating the 25<sup>th</sup> anniversary of the signing of the STC Agreement. German Ambassadors have frequently hosted science-related events in formal and informal settings, and other Embassy staff have, over the past decade, contributed time and funding to building a very positive science relationship.

#### D) BMELV projects

Responsibility for the STC Agreement in applied research in agriculture, forestry, fishery and related topics sits with the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV). BMELV offers financial support to researchers and facilitates bilateral contacts. Cooperation generally includes an exchange of people, information and material. Since 1978, the BMELV and the New Zealand Coordinator agree on the individual projects to be supported at their annual meeting in Germany. BMELV regards the bilateral cooperation as being highly positive.

The projects supported by BMELV cover a large variety of topics relating to food, agriculture, horticulture and the environment. Recent project topics include:

- plant and animal health;
- optimising animal reproduction rates;
- implementation of precision agriculture technologies for livestock farming;
- genetic and species diversity;
- risk assessment of food;
- minimising soil contamination; and
- the impact of legal and political framework conditions on the competitiveness of dairy farming in New Zealand and Germany.

In general, one or two project partners visit for a period of up to 4 weeks per year. The funding period is variable between one to eight years. Since 1998, 15–20 projects have run each year.

### Success story: milk production

AgResearch and the Institute for Biology Dummerdorf have established a very rewarding collaboration on “Milk fat” and “Udder health”. The cooperation has, in a few years, resulted not only in excellent scientific results which will lead to optimised milk production, but also to significant research papers. Another significant output of the collaboration is a German patent (No 199 46 173) which describes how a particular 2 DNA nucleotide exchange in the bovine genome results in a low fat milk.

Prof. Hans–Martin Seyfert, the German lead scientist in the project, was awarded as a JvH–Fellow in 2005. More details on the collaboration are provided in Section 6.C.



**Picture:** Prof. Hans–Martin Seyfert prepares samples for micro–array analysis to allow comparison of genes for infected udder tissue with those of non–infected tissue.  
Photograph courtesy Richard Bentley

#### E) Alexander von Humboldt Foundation

The Alexander von Humboldt Foundation (AvH) offers sponsorship programmes for applicants from abroad (Research fellowships for scientists and scholars) as well as fellowships for applicants in Germany (Feodor Lynen Research Fellowships).

Humboldt Research Fellowships are offered to top non-German scientists and scholars of all nationalities and disciplines, aged up to 40, from abroad. The Fellowship provides for a long-term research stay in Germany and up to 600 fellowships per annum are awarded. Currently, 97 AvH Fellows are from New Zealand, although some of these now work in other countries. Fellowships are awarded on the basis of research quality merit criteria, irrespective of the candidate's nationality.

Up to 150 Feodor Lynen Research Fellowships are awarded annually to highly qualified German PhDs under 39 years of age. The Fellowship enables them to undertake a long-term period of research at the institute of a former AvH Fellow. Four Lynen-Fellowships were given to foster New Zealand cooperation during the last 3 years.

New Zealand has always fared well with AvH awards applications. In 2004, for instance, six out of seven applications for fellowships were approved, an extraordinarily high success rate. Over the last decade, the research topics of New Zealand applicants ranged from chemistry, geology, mathematics, engineering, architecture and politics. Most Fellows appointed in the last five years have been based at the University of Auckland.

In February 2004, the AvH held a colloquium for its Australasian Fellows at the University of Auckland. DFG President Prof. Wolfgang Frühwald led a delegation to the meeting, which saw 100 Humboldtians exchange information about the latest research results through presentations, discussions and workshops covering the areas of Humanities, Genetics, Chemistry and Physics. The colloquium was attended by AvH staff as well as representatives from DAAD, DFG and the Fraunhofer Institution.

#### F) DFG funding of collaboration

The DFG is the major public funding organisation responsible for promoting research in Germany. Its activities focus on funding research projects carried out by scientists and academics working at universities or research institutes. The work of the DFG serves all branches of science and the humanities to reflect its role as the self-governing organisation of German science and research.

DFG membership comprises German universities, non-university research institutions, scientific associations, and the Academies of Science and Humanities. The DFG receives its funding from federal sources, as well as from regional state authorities.

As a supplement to its project and fellowship funding activities, the DFG funds international cooperation and exchanges through visits of German researchers to partners in all parts of the world. It also provides grants for participation in international conferences and bilateral workshops. DFG operates these activities both within its own funding programmes and on the basis of bilateral cooperation agreements with organisations in countries worldwide, with scientific quality being the sole criterion used in determining support.

Since 2003, DFG has funded seven visits to New Zealand. A major workshop on “Plant Cell Walls” in Hamburg, with the participation of six New Zealand scientists, was also funded in 2006.

Research funding by DFG is open to proposals from all areas of science and humanities. Two significant projects with substantial DFG funding, specifically involving New Zealand partners, have been documented during the last five years – one in the area of material sciences, the other in chemical water treatment.

### Success story: composite materials

A collaborative project led by Prof. Klaus Friedrich from the Institute for Composite Materials (IVW) at the University of Kaiserslautern and Prof. Debes Bhattacharyya from the University of Auckland (UoA) 's Centre for Advanced Composite Materials on "Roll Forming of Thermoplastic Composite Materials" was supported by DFG mainstream funding between 2000–2003. Prof Bhattacharyya also visited Prof. Friedrich under DFG Fellowship and Guest Professorship programmes.

One major area of collaborative work has been the roll forming of continuous fibre reinforced thermoplastic composite sheets (the UoA has an international patent on the technique) that has resulted in the establishment of a manufacturing company in the USA. Joint UoA/IVW commercialisation of the research in Europe is also intended.

To date, the project has also resulted in ten reviewed publications as well as extensive German student placements at Auckland University to undertake postgraduate research work.



**Picture:** Prof. Debes Bhattacharyya from the University of Auckland's Centre for Advanced Composite Materials. Photograph courtesy University of Auckland.

## New Zealand

### G) S&T Cooperation initiatives supported by MoRST

MoRST and its predecessor the Department of Scientific and Industrial Research have been responsible for implementing the STC Agreement since 1978. In 1998 MoRST contracted out the administration of STC Agreement-related programmes to the Royal Society of New Zealand (RSNZ).

MoRST's commitment to the bilateral arrangement has grown over the years. Initially a quarter-time STC Coordinator was established with a \$25,000 per annum budget for a travel grant programme. In 2006, the half-time Coordinator has a \$50,000 STC travel grant programme, a \$25,000 MoRST-DFG fund, the Julius von Haast Fellowship programme and 20% of a MoRST Senior Adviser's time to support his work.

This increased commitment and formal linkages (such as the arrangements MoRST has signed with the DFG and the AvH which operate under the STC Agreement), reflect the importance MoRST gives to New Zealand's relationship with Germany.

In 2001 MoRST commissioned PricewaterhouseCoopers (PWC) to review New Zealand's activities under the STC Agreement. PWC concluded that the activities undertaken in relation to the STC Agreement have added value to the New Zealand RS&T sector in the following ways:

- Germany recognises New Zealand's research capability and invests in research exchanges;
- German research funding agencies have developed a strong interest in RS&T collaboration with New Zealand and want to partner with New Zealand agencies; and
- the STC Agreement is an important component of the good bilateral relationship.

PWC found that “the STC Agreement has led to a continuing and developing RS&T relationship between New Zealand and Germany at several levels which are key to the growth of knowledge in a global economy. This review has found that the existing activities undertaken to support the Agreement are efficiently carried out and there is a high level of commitment from existing stakeholders”.

A 2002 MoRST survey found that 14% of New Zealand researchers have an active collaboration with a German counterpart, making that country our fourth most significant (by number) RS&T partner. The survey revealed that cooperation was particularly important in biological sciences, IT, computing, environmental, physical and earth sciences, engineering & technology research areas.

Based on the survey and the PWC analysis, MoRST established Germany as a top priority for bilateral cooperation in its initial international strategy, a position it has maintained in subsequent iterations. The 2007 Strategy will maintain Germany’s status as a primary partner.

#### H) Coordinator role and initiatives

Dr Werner Friedrich is New Zealand’s Coordinator. Dr Friedrich was appointed to the role in 2002 and he will hold the role until the end of 2006.

The New Zealand Coordinator’s primary objective is to ensure that New Zealand gains full benefit from the STC Agreement by:

- maximising opportunities for New Zealand researchers to collaborate with their German counterparts;
- maximising opportunities for New Zealand research and technology-based businesses to collaborate with their German counterparts;
- establishing and enhancing key relationships within the New Zealand and German research, science and technology (RS&T) and innovation sectors; and
- ensuring that MoRST is informed of all significant developments within the German RS&T system.

To achieve his objective, the Coordinator works with researchers, research organisations, funders and policy agencies in Germany and New Zealand.

Dr Friedrich also administers the MoRST–DFG S&T cooperation arrangement and contributes to the RSNZ assessment of applications for funding under the German International Science And Technology (ISAT) programme.

“The networking skills of the New Zealand Coordinators has maintained and expanded German interest in the STC Agreement and into bilateral collaboration with New Zealand in more general terms. The high profile of the Coordinators, as researchers and Cabinet appointments, has demonstrated that New Zealand has a research capability and takes RS&T seriously. This capability has enabled the Coordinators to move freely among German researchers and their funding agencies. By building relationships, the Coordinators have been able to leverage German funding sources for New Zealand researchers and for bilateral projects.”

*2001 PriceWaterhouseCoopers Review of New Zealand Activities Undertaken in Support of the Science and Technology Cooperation Agreement between New Zealand and Germany*

The PWC report stated that the (New Zealand) Coordinator is “pivotal to the success of the STC Agreement ... The high profile and the work by Coordinators has opened up doors in Germany and enhanced German interest in engaging New Zealand researchers in additional RS&T activities.”

Dr Friedrich has been very active in initiating and supporting bilateral contacts. For example, in 2004 he organised and accompanied the large German delegation attending the AvH Colloquium on its visits to Canterbury, Auckland, Wellington and Palmerston North to promote bilateral opportunities. He also played a significant role in MoRST’s establishment of the Julius von Haast Fellowship and in negotiating the MoRST/AvH Arrangement.

He has also, in recent years, taken senior researchers from New Zealand’s Centres of Research Excellence (CoREs) with him to Germany to help them identify and build links with prospective partners. The 2006 Julius von Haast Award to Prof. William Martin to work with staff of Massey University’s Allan Wilson Centre for Molecular Ecology and Evolution was made possible through Assoc. Prof. Peter J. Lockhart’s participation in the Coordinator’s 2006 visit to Germany.

Dr Friedrich also played a significant role in establishing the agreement between the New Zealand Vice Chancellors' Committee (NZVCC) and the Hochschulrektorenkonferenz (University Rectors' Conference – HRK) which was signed in June 2006. This agreement promotes academic links and provides a framework for assessing equivalence in tertiary qualifications. The NZVCC and the HRK have agreed that one of their joint work areas will be to link research and study to the needs of the knowledge society. Seven of New Zealand's eight universities have formal arrangements with German research/academic institutions across 22 science areas and there are hundreds of lower level arrangements at Faculty or Departmental level.

#### I) New Zealand Embassy in Germany

The New Zealand Embassy in Berlin plays a key role in promoting and facilitating the smooth operation of the STC relationship. The Embassy has developed and now maintains links with key German RS&T partners, including the AvH Foundation, DFG, the Helmholtz Foundation, and the Fraunhofer Institute. The Embassy facilitates the biannual visits from the STC Agreement Coordinator and acts as a go-between and door-opener to German policy and funding agencies for the New Zealand science community. It was in this capacity that the Embassy proposed a review of the 30-year old agreement, and met with the German Federal Science and Education Minister, Hon Annette Schavan, to seek her support for the initiative.

The Embassy has organised special events to promote New Zealand's science capabilities, including a presentation at the DFG in Berlin 2005, attended by Dr Friedrich, the Brussels-based NZ Science Counsellor and representatives of other Berlin-based embassies, and a presentation by Prof. Hugh Blair in Bonn on New Zealand's animal and veterinary research capabilities.

The Embassy's broader role in supporting education linkages between Germany and New Zealand has a direct impact on the STC. The signing of a bilateral links agreement in June this year between the NZVCC and the HKZ (see section H) was in part the result of ongoing efforts by the Embassy.

J) The MoRST/RSNZ travel grant programme

MoRST's first travel grant programme to support the New Zealand–Germany STC Agreement was established in 1978. Subsequently, the nominal value of the programme doubled to \$50,000 per year; in fact contracts valued at \$308,651 have been awarded over the last six years.

In 1997 the RSNZ took over responsibility for administration of the programme from MoRST, but the funding is still provided by the Ministry through its International Science And Technology (ISAT) Linkages Programme.

Since 2000, 73 contracts have been awarded. These cover all research areas but most linkages are in the life sciences, (26) earth sciences (16) and physical sciences (9) fields. Crown Research Institutes (35) and universities (33) have been most successful in winning support under the programme.

K) MoRST–ISAT DFG programme

In 1997, following a visit by its President to New Zealand, the DFG signed an arrangement with MoRST to support bilateral collaboration through three mechanisms:

- exchanges of research scientists of at least post–doctoral or equivalent level for periods of up to six weeks;
- assisting exploratory missions of senior scientists and officials to explore opportunities for joint ventures and scientific collaboration; and
- joint seminars and workshops.

MoRST provides \$25,000 per year to the RSNZ for the Coordinator to allocate to projects agreed with DFG. Since 2000, 18 projects (mainly targeted towards basic sciences) have been supported in a diverse range of topics such as mathematics, hydromechanics, biomedicine or information technology.

MoRST has spent \$120,0000 on DFG initiatives in the past five years. In the past two years the fund has been used to support bilateral workshops in the following topics:

- Bioproduction – Efficient Mass Production of Useful Microbial Agents;
- Radiative Transfer Modelling for the Interpretation of Differential Optical Absorption Spectroscopy Measurements;
- The Plant Cell Wall as a Complex Biocomposite – Linking the Primary and the Secondary Walls;
- The Chemistry and Physics of the Heavy and Super-Heavy Elements; and
- Functional Nanostructures and Nanomaterials.

#### J) Julius von Haast Fellowship programme

MoRST introduced the Julius von Haast Fellowship (JvH) in 2004 to complement the programmes of the AvH. A Memorandum of Understanding between MoRST and AvH on reciprocal programme recognition was signed in June 2004.

The Fellowship is named after Sir Johann Franz Julius von Haast, a German geologist who came to New Zealand in 1858. He spent many years investigating the geology, flora and fauna of the Nelson and Canterbury Districts. He also founded the Canterbury Museum in Christchurch, where he served as Director for 14 years.

Under a JvH Fellowship, internationally renowned German scholars and scientists undertake research in New Zealand, for up to 12 weeks per year over three years. One appointment is made per year. The JvH Fellowship allows internationally recognised German researchers to spend time working collaboratively with their New Zealand colleagues, and to establish or enhance collaborative research of benefit to both countries. The Fellowship is open to all fields of research including social science, humanities and both traditional and developing sciences.

The Fellowship is funded through New Zealand's ISAT Linkages Fund, and is administered by RSNZ.

The JvH Fellowship scheme appears to have been very successful to date. The Fellows have made substantial contributions to New Zealand's work in the fields

involved and even in the short time the programme has been operating, important research papers have been generated.

The Julius Von Haast Fellows have been:

Prof. Dr. Horst W. Hamacher, Mathematics Department, University of Kaiserslautern, working with Assoc. Prof Matthias Ehrgott of Auckland University on “New Operations Research/Mathematical Programming (OR/MP) Models which Improve the Quality of Ration Plans in Intensity Modulated Radiation Treatment (IMRT) and Radio Surgery” (2004–06).

Prof. Dr Gerold Wefer, Department of Geo–Sciences, University of Bremen, working with Assoc. Prof. Chris Hendy and colleagues at Waikato University on “Abrupt Climate Change and The Potential Impact for New Zealand” (2004–07).

Prof. Hans–Martin Seyfert, Institute for the Biology of Farm Animals (FBN), Dummerdorf, working with Dr Adrian Molenaar, AgResearch, Hamilton on “Specific Bovine Mammary Gland Anti–mastitis Defence Factors” (2005–08).

Prof. Dr William Martin, Institute for Botany, Heinrich Heine University, Düsseldorf, working with Assoc. Prof. Peter J. Lockhart and colleagues of the Allan Wilson Centre for Molecular Ecology and Evolution, Massey University, Palmerston North on “Molecular Evolution” (2006–08).

#### M) New Zealand mainstream funding of collaboration

Government funds about 60% of the R&D undertaken in New Zealand. Most of this funding (about \$500 million per year), is invested through contestable programmes administered by the Foundation for Research Science and Technology (the Foundation). No specific weighting is given to international linkages in the Foundation funding process; consequently there is no value to bidders from accurately identifying prospective international partners. Therefore, the Foundation’s data on collaborations is incomplete and likely to under–report collaborations. However, the Foundation’s records do show that New Zealand researchers are, across all science areas, working with German partners. In its 2004 funding round, across all of its main research funding

instruments<sup>1</sup>, the Foundation funded 186 contracts, of which 34 (18%) reported a German partner.

The New Zealand Health Research Council (HRC) is the Crown agency responsible for managing the Government's investment in public good health research. Its 2006–07 funds for allocation come to just under \$60 million.

The HRC does not capture much data from researchers on their international connections. However, the HRC has identified ten significant biomedical/biochemistry or social research projects which it has funded over the past six years in which German partners played a significant role.

The Marsden Fund was established by the New Zealand Government to support excellence in research and researchers. Research funded from the Marsden Fund is not subject to priorities set by the government. In 2006/2007, the Marsden Fund, which is administered by the RSNZ, will make available \$38.2 million to support qualifying research in any field.

The Fund's objectives are:

- to enhance the underpinning research knowledge base in New Zealand, and contribute to the global advancement of knowledge;
- to broaden and deepen the research skill base in New Zealand; and
- to undertake research that is investigator driven.

As New Zealand's premiere 'blue skies' science, merit-driven research programme, Marsden Fund contracts are highly sought after by researchers in all fields.

A total of 339 Marsden Fund contracts were operational at 30 June 2006. Of these, 262 had reported to the RSNZ on the activities that had taken place. Forty (15.2%) of these reported a German collaborative partner, although it is likely that some of these connections will not be significant. Nevertheless, this figure suggests that New Zealand's best researchers do have proportionally stronger links with Germany than their colleagues as a whole. In fact, 4% of Marsden-funded Principal and Associate Investigators are based in Germany.

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<sup>1</sup> Social, Environment, Maori Knowledge, New Economy Research Fund and Research for Industry Output classes.

### Success story: atmospheric trace gases

A cooperative project on **Spectroscopic Studies of Atmospheric Trace Gases** between the Institute of Environmental Physics at the University of Heidelberg and the National Institute for Atmosphere and Water (NIWA) at Lauder, New Zealand has operated for several years.

A spectrograph detector unit was installed by NIWA at the New Zealand Antarctic Station “Scott Base” in 2002. The aim of the project was the study of trace gas distributions in the atmosphere by Differential Optical Absorption Spectroscopy (DOAS). With this well known technique different trace gases (e.g. ozone, BrO, NO<sub>2</sub>, IO, OCIO) can be detected in measured uv-visible scattered sun light spectra by means of their individual absorption structures.

The instrument works with an adjustable mirror system (Fig.1) that sequentially scans different viewing directions between zenith and horizon. The analysis and interpretation of these measurements have been the central focus of the project.

During the project both New Zealand and German research teams successfully developed and improved their radiative transfer models, which has led to a still-ongoing cooperation. Several papers have been published in international journals.



Picture: The adjustable mirror system at the Arrival Heights observatory close to Scott Base.

## 6) Case studies

Four case studies were carried out by IB–BMBF and MoRST via questionnaires and interviews with scientists in New Zealand and Germany. The survey sought answers to the following questions:

- How have the activities contributed to the objectives of the STC Agreement?
- What benefits have arisen from the relationship?
- How did the relationship develop over time?
- What (interventions, initiatives, key activities) made the relationship successful?
- What barriers to a successful relationship arose and how were these/could these be overcome?

### **A) Industrial Research Limited (IRL)'s work with the German Aerospace Agency (DLR) and other German agencies on high temperature ceramics**

#### ***Activity***

The scientific collaboration between Prof. Mackenzie at IRL & Prof. Schneider from the DLR Institute of Materials Research has remained active (but not continuous) for some 20 years. During this period, researchers from Prof. Mackenzie's team have learned about new advances in ceramic thermal barrier coating technologies, while German partners have benefited through Prof. MacKenzie's expertise in chemical structure characterisation using solid state nuclear magnetic resonance (NMR) techniques. One specific area of research focus has been study of the high temperature ceramic 'Mullite'. Prof. MacKenzie has participated in three conferences on Mullite, organised by Prof. Schneider and DLR, and was on the organising committee for the 2000 conference in Scotland. In 2006 Prof. MacKenzie was an invited speaker at the 2006 Mullite conference in Vienna.

The cooperation resulted in around 20 joint publications over the last 10 years and Prof. MacKenzie has achieved a prominent international profile in Solid State NMR spectroscopy, authoring two major books. He has also been awarded three of New Zealand's most significant science honours – Fellowship of the RSNZ, the Hector Medal and the Shorland Medal.

Some joint DLR–IRL–Victoria University Wellington projects have been funded externally, in New Zealand by the Foundation and the Marsden Fund, in Germany by BMBF. The results of the current joint project on environmental barrier coatings will be used in the development of system solutions for the new WHIPOX® DLR material.

### *Analysis*

The STC Agreement requires collaborative research with mutual benefits. The cooperation between IRL and DLR is a long standing (20 year) person-to-person relationship. It fulfils the requirements and expectation of the agreement but did not evolve into a broader form of cooperation bringing other researchers and the institutes together or creating new programmes or infrastructure. However, with the retirement of Prof. Schneider at DLR, Dr Schmuecker will take over the cooperation. He has already delivered excellent tuition courses in advanced Electron Microscope techniques at IRL and Victoria University. With the refocusing of IRL's scientific priorities a revival of the cooperation is expected.

Both sides have been able to conduct cutting edge research in an emerging and interdisciplinary field. Researchers from Prof. Mackenzie's team had access to research facilities not available in New Zealand. International reputation, science awards and successful joint publications demonstrate the positive outcomes.

The collaboration has benefited, on the New Zealand side, from Foundation and ISAT funding. The German partners have received IB–BMBF–funding as well as ongoing support from institutional funding by the Helmholtz Association, which receives most of its funding from BMBF. In addition DLR, IRL and the Victoria University of Wellington financed the cooperation with institutional money. Both parties consulted the Coordinators in Germany and New Zealand to help build the relationship. The main reasons for the successful cooperation are a positive person to person relationship as well as complementary technical skills and scientific knowledge.

**B) The National Institute for Water and Atmospheric Research (NIWA)'s climate change collaborations with German universities, Max Planck Institutes and National Research Centres**

***Activity***

The linkages between Germany and New Zealand in the field of atmospheric chemistry go back more than 30 years. The basic reasons for the quality and duration of these linkages are that Germany has an outstanding reputation for top research in atmospheric chemistry backed up with excellent universities and research institutes. New Zealand not only has an international reputation for, and interest in environmental research, but its location in the Southern Hemisphere provides an excellent platform for research into atmospheric chemistry. It is close to Antarctica and it enables sampling of clean on-shore air at coastal sites. In addition New Zealand has proven research facilities and a stable and benign political environment.

The first breakthroughs in modern atmospheric chemistry were made at what is now the Max Planck Institute for Chemistry in Mainz back in the 1950s and '60s. Since then, both countries have complemented each other's research programmes in atmospheric chemistry and New Zealand universities and NIWA have become an employer of many graduates from German Universities.

Major personal linkages were built by NIWA's Dr Andrew Matthews who spent several years at the Max Planck Institute for Aeronomy, Lindau on a Humboldt Scholarship. This initial contact enabled the setting up of a stratospheric ozone and research programme based at Lauder, in New Zealand's Southern Alps. This is now one of the five Network for the Detection of Stratospheric Change sites chartered by the United Nations. Dr Matthews later became the New Zealand Coordinator of the STC Agreement, which allowed him to broaden and deepen his links with German atmospheric scientists and organisations.

Current links between research at Lauder and German research institutions involve the: University of Heidelberg, DLR-Institute for Physics of the Atmosphere, Free University of Berlin, Institute for Botanics and Pharmaceutical Biology, University of Hannover, University of Bremen, Institute of Meteorology and Climate Research FZ Karlsruhe, and Bruker Optik, a private company based in Karlsruhe.

A second personal link was made by Dr Dave Lowe, now of NIWA's Greta Point campus, who undertook his PhD in atmospheric chemistry at the University of Cologne between 1978 to 1982 with practical work at the Kernforschungsanlage Institute for Atmospheric Chemistry at Kernforschungsanlage Juelich. This contact led to the establishment of the very successful tropospheric-atmospheric chemistry group at NIWA, Wellington.

Over the years, these connections have led to over 100 exchange visits by German and New Zealand scientists and students.

### *Analysis*

The cooperation in atmospheric chemistry is an example of a bilateral long-term cooperation with a continuous flow of joint research and exchange, triggered by single personal contacts but now involving a large number of different research centres in both countries. The collaboration represents the ideal relationship under the STC Agreement.

Significant mutual benefits have arisen from the relationship. For New Zealand, the cooperation with German partners opened the door to cutting edge research and laboratories. For its part Germany gained access to one of the most exciting parts of the world in which to undertake atmospheric research. For both countries the scientific benefits are manifold and have led to stellar international reputations in the field.

Over the past 25 years, NIWA has developed an excellent scientific capability in atmospheric sciences, to which its linkages with German colleagues has made an appreciable contribution. Today, the combination of the New Zealand's unique geographical situation and NIWA's excellent research infrastructure and capability in atmospheric and climate change science provides a platform for involvement, and indeed leadership, in international programmes such as the Intergovernmental Panel on Climate Change (IPCC) process. NIWA's atmospheric and climate change teams have been awarded many Marsden Fund, and Foundation mainstream funding contracts. The German groups, many of which are world leaders in their fields, have been funded by different sources, but mostly from BMBF and DFG mainstream programmes.

Throughout the life of the collaboration, both NIWA and its German partners have used the support programmes provided under the STC agreement to build their collaborative efforts. The ISAT programme has funded three new contacts since 2000, the services of the Coordinators in both Germany and New Zealand have been employed, and several NIWA staff members have been awarded AvH Fellowships. The Germany–NIWA network in atmospheric research was funded by the National Research Facilities (mainly Helmholtz and Max–Planck). Additional support was provided to five German universities through the IB/BMBF–funding scheme.

Two factors made the cooperation successful. First of all, the research topic obliges international cooperation: German researchers (as with other Northern Hemisphere and equatorial–based researchers) need to work in Southern countries. New Zealand researchers have needed to work with well–equipped, cutting–edge research laboratories in Europe, Japan and the USA to build up and complement their relatively small science capability.

Secondly, and probably more importantly, the personal contacts established by leading New Zealand–scientists in the 1970s have been sustained and broadened to operate successfully at the institutional as well as researcher–to–researcher level.

A wide variety of mobility and support instruments provided by both governments have also been used to keep the exchange going, leading to mainstream and institutional funding being secured for large research projects. Bilateral meetings, international workshops and conferences with many participants from both countries identified, analysed and focussed the bilateral scientific projects.

### **C) AgResearch’s work with the Research Institute for the Biology of Farm Animals (FBN) on bovine molecular biology and other pastoral research**

#### ***Activity***

The cooperation between the FBN and AgResearch started in 1998 with an ISAT–funded project on the New Zealand side and a project funded by the DFG at FBN. The main counterparts were, and still are, Drs Adrian Molenaar and Tom Wheeler at AgResearch and Prof. Hans–Martin Seyfert at FBN. The

cooperation in molecular biology, especially the in molecular control of milk, has augmented this area of research as a core competency in both organisations. A major goal of both groups is the improvement of udder health and understanding molecular principles and genes regulating the immune defence in the udder. Both groups contribute to national and international clusters-of-excellence. Prof. Seyfert is the initiator and spokesman for the DFG-funded Researchers Group 585, in which seven groups are working together to analyse Pathogen-specific defence mechanisms in the mammary gland. On the EU-level, the FBN group contributes to the EU-funded EADGENE Network of Excellence on host pathogen interaction, coordinating the focus on mastitis in this network.

Through the cooperation with FBN, AgResearch is linked to EADGENE and gets contacts to the other European partners. The cooperation is mainly driven by mutual research visits (four-eight weeks) of senior scientists. In 2005, Prof. Seyfert was awarded a Julius von Haast Fellowship to further strengthen his links with AgResearch and other New Zealand researchers on "Bovine Mammary Gland Anti-mastitis Defence Factors".

### ***Analysis***

This cooperation has evolved, over the last 8 years, from an initial e-mail contact following up on a literature reference, to become a major collaboration. The two groups involved are among the five leading groups worldwide in this particular research area. Many of the STC Agreement-related instruments, such as BMELV and ISAT funding, the Julius von Haast Fellowship and the New Zealand Coordinator have been utilised to foster the relationship. As well, the IAESTE – International Association for the Exchange of Students for Technical Experience – scheme has been used to fund student internships and the EU Framework Programme 6-funded Network of Excellence Programme also supports the collaboration.

The collaboration has produced not only a successful track record of scientific publications, but has also led to the development of a major research field in both countries. For New Zealand, the cooperation is of additional value due to the EU connection. The research topic is of national interest for both countries as well as for the European Commission because (despite its basic scientific nature) the outcomes of the research will have significant implications for the

economically important dairy production sector. Consequently, both the FBN and AgResearch groups are now recognised internationally as undertaking world class research in this important field.

The short term benefits to date from the collaboration are shown by the fact that six joint papers have already been published and more are in preparation. The project itself is generating new knowledge. Prof. Seyfert has identified a ground-breaking observation on epigenetic regulation of milk synthesis, which is expected to become an important element of AgResearch's future work.

Long term benefit for AgResearch is expected from its involvement in the EADGENE network. It has already resulted in several student visits from other labs in Germany and will see contacts made with other European research groups. In addition, it is expected that AgResearch will be involved in a national New Zealand-based mastitis consortium. The New Zealand involvement in this particular area of research has allowed FBN to build a bigger critical mass for its own studies.

**D) The University of Auckland (UoA)'s Department of Chemical and Materials Engineering collaboration with Prof Hans Müller-Steinhagen of the DLR Institute for Technical Thermodynamics, and the Institute of Thermodynamics and Thermal Engineering, University of Stuttgart, (UoS) on "Coatings for Lightweight Bipolar Plates for Solid Polymer Fuel Cells"**

***Activity***

Professor Müller-Steinhagen worked at the UoA throughout the 1990s. When he moved to the DLR Institute and the UoS, Prof. Müller-Steinhagen initiated a collaborative project on coatings for energy applications with one of his ex-colleagues at the UoA, Dr Margaret Hyland. The project, which ran from 2001–2004 focused on the use of titanium nitride (TiN) coatings in novel applications – specifically fuel cell electrodes and heat exchangers. Staff and student exchanges took place through this project, and Dr Hyland received support from the RSNZ travel grant programme.

After a preliminary study of the corrosion resistance of TiN on aluminium, it became clear that there were many obstacles to its use in fuel cells. However, as a result of the preliminary study, and building on the heat transfer and

fouling expertise in both universities, a new and exciting possibility of using these and related coatings in anti-fouling applications has become apparent. This is expected to be the focus for further collaboration.

The linkage was funded by institutional support and an ISAT grant. However, no active collaboration currently exists, not because of lack of willingness of the partners, but rather for lack of funding for research costs and lack of time to write high-risk proposals. Three research applications in New Zealand that would have supported UoA–Stuttgart joint activities were unsuccessful.

### *Analysis*

The cooperation was based on a long-term personal relationship. The partners in the exchange contributed complementary skills and expertise. The German partners provided expertise in fuel cell design and technology and in specialised coating deposition techniques, and access to UoA researchers to this deposition equipment that is not available in New Zealand. So the project gave UoA researchers access to a unique scientific infrastructure. In return, UoA contributed by providing specialised materials and surface analysis expertise and access to advanced surface analysis techniques. The collaboration gave postgraduates a broader research experience. However, the collaboration is weak because the project topic is not one of New Zealand's national R&D interests and there is no significant New Zealand industry in that field to exploit the research results. A gap in knowledge, technical capabilities and industrial interest between New Zealand and Germany is visible.

## 7) Analysis of the bilateral S&T relationship

MoRST and BMBF have analysed the data reported in sections 5 and 6 and have drawn four general conclusions. Following discussion with RS&T agencies in both countries, BMBF and MoRST have identified a number of initiatives which could be taken to coordinate activities. These are discussed in Section 10.

### A) The mutual benefits

MoRST and BMBF observed that the science benefits generally attributed to bilateral research collaboration were seen in the New Zealand–Germany exchanges. These include:

- access to key data sources not otherwise obtainable;
- access to top scientific talent and research facilities;
- development of a critical mass of researchers working on a project; and
- cross-fertilisation of ideas and methodologies.

Germany is a respected research powerhouse, not only within Europe but throughout the world. The OECD reports that Germany undertakes 10% of the world's research, two thirds of which is funded by the private sector.

New Zealand has small but significant pockets of expertise in fields such as climate change, food and animal production and materials science. Its geographical setting also provides a useful contrast and comparison with Germany, as well as making it an excellent host for climate change and Antarctic research. The New Zealand research system focuses on socially/environmentally/economically useful outcomes and the practicality of researchers of both countries results in collaborations with purpose and value.

New Zealand is a highly efficient, if small, contributor to global knowledge stocks. OECD data<sup>2</sup> shows that New Zealand produces 4.8 papers per US\$ million spent on GERD, the second highest of all OECD members. Overall, the country produces 0.6% of the global output of peer-reviewed articles and reviews, but makes much more of an impact in the plant and animal science (1.6%), ecology/environment (1.5%), and agriculture (1.4%) fields.<sup>3</sup>

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<sup>2</sup> OECD MSTI 2005/2

<sup>3</sup> MoRST, *National Bibliometric Report 2001–2004*, 2006

The congruence between the New Zealand Government's Economic Transformation Agenda and the EU's Lisbon Strategy, which strongly influences Germany's innovation policies, means that both Governments share common goals and priorities for their investment in R&D. This commonality is discussed in depth in Section 7.

**B) The depth and breadth of New Zealand–Germany research linkages**

The evidence gathered by BMBF and MoRST shows that the bilateral science relationship is both deep and wide. There appear to be few research fields in which bilateral collaboration does not occur and in many instances the collaborations involve well-credentialed researchers working on major problems of economic, environmental or social importance.

The ISAT travel grant programme data shows that new relationships are being built in all research areas, but that life sciences and biotechnology projects have received about 33% of the grants awarded, followed by Earth and Physical Sciences, with about 20% each of the contracts awarded.

Given the incomplete nature of the data held by New Zealand RS&T Funding and Investment Agents (FIAs) on international collaboration, it is impossible to accurately identify the true dimensions of the bilateral relationship. However, it is clear that Germany represents New Zealand's fourth most significant (by number of collaborations) partner and that at least 10% of New Zealand researchers have an active collaboration with a German partner. Given the distance, language and historical differences between the two countries, this is remarkable.

The PricewaterhouseCoopers' review found that the "magnitude of the (bilateral) RS&T activities are greater because of Government assistance". The difference in the extent of linkages between New Zealand and France, or New Zealand and Japan can reasonably be attributed to the impact of the effort made by New Zealand and German agencies to support the STC Agreement, principally through the travel grant programmes and the work of the Coordinators.

### C) The large number of New Zealand and German contributors to activities under the Agreement

As Section 5 of this report shows, a large number of New Zealand and German research funding, policy and support agencies contribute to the activities under the STC Agreement, as do the respective Ministries of Foreign Affairs through their embassies in Wellington and Berlin. In all cases, these contributions significantly and beneficially impact on the ability of researchers to work together.

One consequence of the multiplicity of agencies involved is complexity. Therefore, one of the most crucial roles of the Coordinators is to advise researchers and their organisations on which counterpart agencies to approach for what support. BMBF and MoRST must also work together to ensure that support agencies in both countries are coordinating their efforts.

For example, currently, there is no coordination required of travel grant applications i.e. New Zealand and German applicants can seek support independently, and indeed may do without any explicit commitment on behalf of their prospective partners to the collaboration. Nor do the ISAT or BMBF/BMVEL assessors consult with each other in evaluating applications or determining support. Different funding approvals and funding periods also can result in difficulties for researchers and diminish the possibility of reciprocity of visits.

### D) The value of coordination

Although the major factor in establishing and maintaining a productive research collaboration is the personal and professional compatibility of the leading researchers involved in the project, BMBF and MoRST observed that the best research outcomes were seen where there had been an explicit intention to develop the relationship via the support mechanisms available. For example, NIWA has used the ISAT programmes to develop the linkages of its more junior researchers and taken advantage of the AvH awards to cement the connections of its more senior scientists. While he was New Zealand's Coordinator for the STC Agreement, Dr Matthews actively sought to foster NIWA's connections with German atmospheric research institutions.

It was also clear to MoRST and BMBF that an absence of coordination and planning could result in promising collaborations not being realised. Therefore, BMBF and MoRST believe, to improve the chances of such collaborations:

- the New Zealand and German travel grant funding programmes should be better coordinated;
- greater involvement of mainstream funding agencies in the assessment of travel grant applications should be sought, to identify projects that are likely to lead to long-term research funding;
- MoRST and BMBF should exchange staff to ensure that they are well attuned to the developments within, and priorities for, the respective national RS&T systems (and consequently, the STC Agreement-support mechanisms are calibrated to achieve optimal engagement); and
- the work of the Coordinators, as with the travel grant programmes, should reflect any bilateral research priorities established and more generally support linkages likely to contribute to achievement of the EU's Lisbon Strategy and New Zealand's Economic Transformation Agenda.

## 8) The EU connection/synergies

Germany strongly endorses the European Union's objectives for R&D, as mandated by the Lisbon Strategy. The Strategy drives the EU to become, through research-driven innovation, the world's most competitive and dynamic knowledge-driven economy by 2010. Consequently, the European Commission's specific research priorities both reflect and influence Germany's investment in R&D. With the strong encouragement of BMBF, German researchers have actively and successfully sought to participate in Framework Programme activities. For example, over 200 German research coordinators applied to take part in the FP6 ERA-NET scheme, of which nearly 60% were successful. Consequently, there are more German researchers involved in trans-European research projects than from any other EU Member State.

The Lisbon Strategy's focus on systematic use of research to boost economic welfare is very similar to the New Zealand Government's Economic Transformation (ET) Agenda. The ET Agenda, which will drive the Government's priorities for the next 10 years, focuses on "working to progress our economic transformation to a high income, knowledge based market economy which is both innovative and creative ..."

Therefore, it is not surprising that there are significant synergies between the priority themes adopted by the Commission for its 7th Framework Programme for Research and Technological Development (FP7) – which commences in 2007 – and the research topics in which the New Zealand Government invests.

Accordingly, MoRST has made New Zealand engagement with FP7 a priority for its work over the next few years. Towards that end two major initiatives have been undertaken – the first is to upgrade New Zealand's formal arrangement with the European Union to full STC Agreement status; the second has been to establish a service to help European and New Zealand researchers establish collaborations under the Framework Programme.

## A) STC Agreement

The 1991 S&T arrangement between New Zealand and the European Commission is not a sufficient framework for EU–New Zealand research cooperation in the 21st century. Many researchers in the EU believe that it is not possible to cooperate with New Zealand in Framework Programme activities because it does not have a S&T Cooperation Agreement with the EU; and some Commission Officials describe the New Zealand Arrangement as having “inferior status” compared with treaty–level Agreements.

The Commission’s Research Directorate General and MoRST aim to conclude a full STC Agreement in conjunction with the commencement of FP7. Doing so will:

- clarify New Zealand’s status as a research cooperation partner under FP7;
- ensure New Zealand’s eligibility as a partner under the People Specific Programme of FP7;
- establish a Joint Science & Technology Cooperation Committee to oversee the relationship;
- enable the updating of the focus areas identified in the current Arrangement; and
- create a revitalised and refreshed formal framework appropriate for a dynamic cooperative relationship.

Although an EU–NZ STC Agreement will help New Zealand researchers engage (with German partners and others) in Framework Programme projects, it does not supersede, or negate the value of the Agreement with Germany.

## B) FRENZ

The Facilitating Research cooperation between Europe and New Zealand (FRENZ) platform is a joint initiative between MoRST and the EU Centres Network (administered by the National Centre for Research on Europe), to enhance the engagement of the New Zealand RS&T community with EU Framework Programmes initiatives. The initiative has been co-funded by MoRST and the European Commission, via the EU Centres Network project.

The FRENZ platform facilitates the engagement of New Zealand research organisations and their researchers with FP programmes and other EU opportunities. It:

- delivers relevant information on research cooperation opportunities through themed emails and web pages aimed at different research disciplines;
- provides high quality advice, guidance and training on all aspects of applying for and managing European Commission research projects;
- develops resources specifically designed to address New Zealand participation in European Commission research programmes; and
- assists organisations in the development of strategies to increase their involvement in the Framework Programme.

To meet these aims, FRENZ services include:

- a “Helpdesk”;
- a series of weekly research discipline themed emails, addressing opportunities and key policy developments;
- a website of resources linked to New Zealand participation in the Framework Programme and FRENZ activities;
- briefing visits tailored to the needs of institutions – European strategy development, seminars, training courses, proposal writing and project management assistance;
- a series of training courses and information events tailored to specific calls or topics; and
- participation at relevant research conferences to promote both opportunities for EU–New Zealand partnering, and the FRENZ service.

The FRENZ Director is Ms Carole Glynn, who has extensive experience of the operation of Framework Programmes instruments, particularly through her work with the UK Research Office.

C) Common interests

Four research areas of particularly strong common New Zealand–EU interest are: Health; Food/Agriculture/Biotechnology; Information and Communication Technologies (ICT); and Environment research.

*Health Research:* New Zealand has made great efforts to combat major human diseases. An example is AgResearch's work on transgenic technologies in which high-value proteins are expressed in milk from cattle and sheep and used for biopharmaceutical purposes. Future research will focus on developing vaccines against chronic diseases such as asthma and psoriasis. Both the FP7 health theme, as well as Germany's federal research focus, are on research into chronic diseases.

*Food, Agriculture and Biotechnology:* New Zealand's reliance on its primary industries of agriculture and horticultural means it has developed strengths in food quality and safety. These strengths extend across the entire food chain. Three major objectives of the EU's food, agriculture and biotechnology work are to develop: superior genetic stocks of farmed animals; crops with enhanced resistance to pests and diseases; and improved nutritional qualities in food. The EU targets the development of novel plants and optimised animal production within the thematic area of Food, Agriculture and Biotechnology. Similarly, Germany invests significant funds to improving plant and animal breeding processes and products.

*ICT:* Both the European Union and New Zealand's Government recognise that becoming a Knowledge Society will depend on the development and adoption of Information and Communication Technologies. Therefore, both are investing heavily in new ICT and actively promoting public use of such technologies. The Human Interface Technology Laboratory of New Zealand (HITLabNZ) is an annex of the HITLab of the Seattle-based University of Washington, and has been established to take advantage of opportunities to develop new more effective and intuitive interfaces to link humans with computers and computer-based systems. It works closely with many European partners, including those from Germany.

HITLabNZ typically hosts ten German intern students a year from a variety of universities, including the Bauhaus University, University of Applied Science in Darmstadt, Technical University of Munich and the University of Applied Science in Emden. HITLabNZ is also involved in the *Callas* FP6 project with 18 other partners, including the University of Augsburg.

*Environment, including Climate Change:* New Zealand scientists have pioneered isotopic techniques for identifying changes in sources and sinks of greenhouse gases, played key roles in the understanding of ozone depletion and variability in ultraviolet radiation, and contributed internationally to global and regional climate modelling. For example, NIWA, Landcare Research and Lincoln University all have significant expertise and research trial infrastructure in understanding and minimising the production of pastoral greenhouse gases. The EU and Germany's support for environmental R&D includes a significant investment in climate change and atmospheric research. Germany, like New Zealand, is recognised internationally as having top class capability in these research fields. For example, Prof. Paul Crutzen, who, as Director of the Max Planck Institute for Chemistry in Mainz, has worked with NIWA's atmospheric research team, was awarded the Nobel Prize for Chemistry in 1995 for his work on stratospheric and tropospheric chemistry, and their role in the biogeochemical cycles and climate.

## 9) Benefits from focusing Government initiatives

From our analysis of the four case studies and the data on projects supported over the past six years, it is clear that the most successful projects are those in which the research capabilities of teams and individuals, and strong researcher–researcher links are actively supported by institutions. One key determinant of future capability and institutional support will be the degree to which the research areas in which collaboration is developed are of significant national interest to New Zealand and Germany. Accordingly, MoRST and BMBF suggest that the New Zealand and German Governments identify and support priority areas under the STC Agreement mechanisms. This, they believe, will assure delivery of the best outcomes from the bilateral RS&T collaboration and from government investment in the supporting instruments.

The six science topic areas identified below are the areas in which BMBF and MoRST see maximum mutual benefit from cooperating. The priority areas identified in Section 7 are those most likely to support long–term collaboration, either with German researchers directly or with German partners in the EU FP7 Programmes: Health Research; Food, Agriculture and Biotechnology; ICT; Climate change and atmospheric research; Marine Sciences; and Polar research.

The reasons for identifying collaborative Marine and Polar research are:

- access to geographically unique research sites;
- access to unique technical capabilities;
- the excellent quality of research capabilities on both side;
- the potentially large benefits of the research to both countries and to global stocks of knowledge; and
- the considerable need for more research in these fields.

Collaborations in other areas should continue to be eligible for support through the travel grant programmes and other support mechanisms, but MoRST and BMBF should work towards ensuring that weighting is given to funding activities in the priority areas.

## 10) Recommendations

These recommendations arose from the MoRST/BMBF discussions held in Wellington in March 2006.

BMBF and MoRST concur that changes to the STC Agreement itself are unnecessary. Any arrangements re: priorities and initiatives should be achieved through a Ministerial exchange of letters.

### Information

#### 1. **Bilateral links should be established on Ministry websites.**

Rationale: Researchers or research managers seeking to build linkages should be able to easily find information about their prospective partners' systems, institutions and opportunities for collaboration. To facilitate this, the MoRST and IB-BMBF websites should include links to each others' website homepage to make finding useful information as easy as possible.

Action: New Zealand and German Coordinators to work with MoRST and BMBF.

#### 2. **Both Coordinators to keep FRENZ informed of opportunities to develop FP7 cooperation which arise through their bilateral activities, and to promote EU-relevant German linkages and opportunities through the FRENZ mechanisms.**

Rationale: One of the objectives of the FRENZ service is to deliver, to both the EU and New Zealand research communities, relevant information on research cooperation opportunities. Consequently, FRENZ has a wide range of mechanisms aimed at promoting EU Framework Programme-related opportunities. Coordinators should communicate news of any such opportunities arising from bilateral developments to the FRENZ Director so that she can advise relevant prospective collaborators.

Action: New Zealand and German Coordinators to work with the FRENZ Director to implement this.

## Priority science areas

- 3. Bilateral collaboration in: Health, Food/Agriculture/Biotechnology, Information and Communication Technologies (ICT), Environment (especially climate change), Marine, and Antarctic research is to be encouraged.**

Rationale: Enhancing collaborations in mutually agreed priority research areas will benefit both countries and give such collaborations a better chance of thriving. The six areas suggested are those BMBF and MoRST believe to be mutually important, and in which each country has complementary strengths and advantages.

Action: Ministers to approve priority areas, Ministries to implement actions to give effect to these priorities.

- 4. Priority research areas mandated under the STC Agreement should remain in place for four years – i.e. reviewed in 2010.**

Rationale: Priorities will change over time, as science responds to new social, environmental and economic programmes. However, it will take some time to see the effect of the prioritisation and the research communities would prefer not to see frequent changes in priorities.

Action: MoRST and BMBF to establish mechanisms for evaluating the effect of the prioritisation and to review the outcomes of these evaluations in 2010.

## Linkages programmes

- 5. Information provided to applicants about the New Zealand and German travel grant programmes should be consistent. Applicants should be encouraged, where possible, to simultaneously make applications in both Germany and New Zealand, and New Zealand and German funding agencies assessment processes should be consistent and coordinated.**

Rationale: BMBF/MoRST analysis shows that research collaborations do best when there is formal recognition and support from both sides. Projects which are supported unilaterally do not usually thrive. Optimising consistency in the application processes and encouraging applicants to lodge bids simultaneously in both countries will ensure that IB-BMBF and the RSNZ/New Zealand Coordinator are able to consider, together, the potential benefits of projects. This should enable them to agree not only whether to support proposals but also to mutually agree other steps that can be taken to support the linkage.

Action: New Zealand and German Coordinators to work with the RSNZ to implement.

**6. Extra weighting should be given to applications in priority areas in assessment of bids under the RSNZ and IB-BMBF travel grant programmes.**

Rationale: The travel grant programmes often support the first significant collaboration between researchers. Having these programmes explicitly support links in priority areas should encourage the development of valuable connections.

Action: New Zealand and German Coordinators to work with the RSNZ to implement appropriate weighting systems into travel grant application assessment processes.

**7. Greater support should be provided for summer schools/workshops in priority research areas.**

Rationale: Workshops and summer schools provide opportunities to develop a critical mass of researchers to address a research topic. Successful workshops result in institutional and multi-institutional linkages, which are consequently stronger and more likely to be productive in terms of developing younger researcher's linkages.

Action: New Zealand and German Coordinators to work with DFG and the RSNZ to implement.

**8. Funding and Investment Agent (FIA) input into assessment of New Zealand travel grant programme bids should be pursued.**

Rationale: Achieving this would allow the Foundation and the HRC to identify new prospective research directions and would help match travel grant programme projects to FIA research portfolios and investment strategies.

Action: New Zealand Coordinator/MoRST to discuss implementation with the Foundation, RSNZ and the HRC.

**9. The New Zealand Coordinator to attend German bilateral co-ordination meetings.**

Rationale: The German funding organisations regularly meet (usually twice each year) to discuss initiatives to boost bilateral linkages. The New Zealand Coordinator should, each year attend one of these meetings to a) provide relevant information on New Zealand developments; and b) increase the likelihood that New Zealand initiatives correspond to the decisions taken at the meeting.

Action: New Zealand and German Coordinators to implement.

## **Government level linkages**

**10. MoRST and BMBF to enhance policy linkages and identify bilateral opportunities at a 'system level' through reciprocal staff secondments.**

Rationale: Despite the differences in their scale and mechanisms, the New Zealand and German RS&T systems share significant commonalities – objectives such as building SME development through Research-driven innovation, management issues such as the need to ensure the best return from Government investments, and interests in seeing advances in the same science areas, such as – but not restricted to – the priority areas identified in this report. Regular exchanges of MoRST and BMBF staff will enhance mutual learning and understanding.

Action: MoRST and BMBF to implement.

## **11. MoRST to shape the 'job description' of the New Zealand STC**

**Agreement Coordinator to:**

- **support priority areas;**
- **build linkages likely to lead to increased optimal commercialisation of research;**
- **be more of a knowledge resource/advisor for New Zealand and German researchers looking to start up collaborations – e.g. to advise on how to find a partner, identify funding sources, etc.**

Rationale: MoRST will review the coordinator position description in September 2006 in time for a new appointment for a 4-year term to be made from early 2007. The changes identified above will position the 'new' Coordinator's work to be more effective in supporting 'the right kind' of bilateral linkages.

Action: MoRST to implement.

## **12. The proposed New Zealand Ministerial Mission to Germany (March 2007) should be targeted to:**

- **build New Zealand's profile;**
- **highlight New Zealand capability in priority areas;**
- **having Ministers sign off on priorities, actions; and**
- **focus discussions on successful initiatives to commercialise research.**

Rationale: The proposed March 2007 Mission is an important opportunity to strengthen linkages at the highest level. Dr Schavan and Mr Maharey would, together, be able to set priority research areas for collaboration and 'launch' initiatives to boost research collaboration. Their interaction would also provide opportunities to highlight, through the general and science media, the depth and breadth of the relationship and the mutual benefits it brings. New Zealand and Germany each have a profound interest in commercialising research. Furthermore, both countries have achieved significant successes in developing pathways to economic growth through research. The New Zealand Mission will be able, for example, to make a useful contribution to German discussions on innovation for SMEs.

Action: MoRST and BMBF to action.

## Other initiatives

### **13. MoRST and New Zealand RS&T Funding and Investment Agents discuss the possibility of ‘tuning their mainstream instruments’ towards European programmes which complement EU Framework research topic priorities where these match with New Zealand’s own priorities.**

Rationale: Europe funds and undertakes over 50% of the world’s non-military research. EU Member State national investment in R&D is increasingly being aligned with the EU’s Framework Programme themes and priorities. These are driven out of the Lisbon Strategy, which has much in common with the New Zealand Government’s Economic Transformation Agenda. New Zealand should, therefore, ensure that its researchers are optimally placed to work with European colleagues on topics of mutual interest.

The decisions of New Zealand’s RS&T FIAs on which specific projects they support are, necessarily, independent of influence from the Minister and the Ministry. Nonetheless, MoRST can influence FIAs to ensure that the research community is aware of, and supported in, linkages which are in the national interest. MoRST will work with the Foundation, the HRC and the Marsden Fund Council to identify how the RS&T sector programmes can better support relevant Europe linkages.

Action: MoRST to initiate discussions with FIAs.

### **14. Foundation–DFG peer reviewers exchange.**

Rationale: The Foundation wishes to increase the degree of international input into the expert assessment of its investment processes. Similarly the DFG is interested in obtaining access to New Zealand expertise for its own peer review processes. MoRST and BMBF can facilitate a dialogue between the two research funding agencies to achieve exchanges which will not only result in the outcomes sought by both organisations but increase awareness of the foci of, processes used, and outcomes from the other’s work.

Action: New Zealand and German Coordinators to work with FRST and DFG.

## **Attachment 1**

### **New Zealand– Germany Science & Technology Cooperation Agreement**

AGREEMENT BETWEEN THE GOVERNMENT OF NEW ZEALAND AND THE GOVERNMENT OF THE FEDERAL  
REPUBLIC OF GERMANY ON SCIENTIFIC AND TECHNOLOGICAL COOPERATION

THE GOVERNMENT OF NEW ZEALAND  
AND THE  
GOVERNMENT OF THE FEDERAL REPUBLIC OF GERMANY

Desiring to strengthen the close and friendly relations existing between their two countries,

Considering their mutual interest in promoting all aspects of scientific and technological cooperation between both countries for peaceful purposes and for their mutual benefit,

Wishing to cooperate by providing additional opportunities to exchange ideas, skills and techniques, and by collaborating on problems of mutual interest,

Recognising the beneficial effects that such cooperation can have on the quality of life and economic well-being of the peoples of their respective countries,

Have agreed as follows:

#### **Article 1**

The Government of New Zealand and the Government of the Federal Republic of Germany shall facilitate and encourage scientific and technological cooperation for peaceful purposes between civilian agencies and organisations in the public and private sectors of each country.

#### **Article 2**

(1) The two Governments shall together determine areas in which scientific and technological cooperation should take place and the ways and means of promoting and implementing such cooperation.

(2) The two Governments may designate cooperating agencies for the purpose of implementing particular cooperative programmes or projects within the areas determined in accordance with paragraph 1 of this Article.

(3) The two Governments, or the designated cooperating agencies as the case may be, may conclude separate implementing arrangements in relation to particular cooperative programmes or projects, specifying terms and conditions, the procedures to be followed, financial responsibilities and other appropriate matters.

(4) The determination by the two Governments of areas in which scientific and technological cooperation may take place shall not affect other agreements, contracts or arrangements existing at the date of signature of this Agreement or concluded thereafter.

### **Article 3**

Each Government, or designated cooperating agency under a separate implementing arrangement, shall bear, in accordance with its appropriate financial and budgetary processes and subject to the availability of funds, the costs of discharging its responsibilities under cooperative programmes or projects unless other arrangements are made. Unless otherwise determined by the two Governments, or designated cooperating agencies, the cost of visits and exchanges shall be borne by the sending Government or designated cooperating agency.

### **Article 4**

Subject to the approval of both Governments, civilian agencies and organisations of third countries may participate in particular cooperative programmes or projects.

### **Article 5**

(1) Exchanges of information in the areas covered by the present Agreement may take place either between the two Governments themselves or between the cooperating agencies designated by them.

(2) Unless the two Governments or cooperating agencies designated by them determine otherwise, scientific information derived from cooperative programmes or projects under Article 2 of this Agreement shall be made available to the world scientific community through customary channels and in accordance with the normal procedures of each Government or cooperating agency designated by them for the particular programme or project.

(3) In some circumstances other conditions and procedures for exchanges of information, including limitation or preclusion of transfer to third parties, may be agreed by the two Governments or the designated cooperating agencies. Such other conditions and procedures shall be covered by the separate implementing arrangements referred to in paragraph 3 of Article 2 of this Agreement.

#### **Article 6**

Unless otherwise agreed the transmittal of information and the supply of materials and equipment under this Agreement or under separate implementing arrangements concluded pursuant to Article 2 shall in no way render either Government liable to the other or any designated cooperating agency liable to any other, with regard to the accuracy of the information transmitted or the suitability of the articles supplied for a specific use.

#### **Article 7**

Each Government shall, in accordance with its laws and regulations, facilitate the entry into and stay within its territory of nationals of the other, and their families, to pursue cooperative activities within the ambit of this Agreement.

#### **Article 8**

Communications between the two Governments in relation to matters or principle arising under this Agreement shall be made through diplomatic channels. Designated cooperating agencies may communicate directly with each other.

#### **Article 9**

The two Governments shall, from time to time, consult together for the purpose of reviewing the implementation of this Agreement.

#### **Article 10**

This Agreement shall apply to Land Berlin, provided that the Government of the Federal Republic of Germany does not make a contrary declaration to the Government of New Zealand within three months of the date of entry into force of this Agreement.

## Article 11

This Agreement shall not apply to the Cook Islands, Niue and Tokelau.

## Article 12

(1) This Agreement shall enter into force on the date on which each Government notifies the other that its respective constitutional and other requirements necessary to give effect to the Agreement have been complied with.\*

(2) This Agreement shall remain in force initially for five years, and thereafter shall remain in force until such time as either Government has received written notification from the other Government of its intention to terminate the Agreement. In such case the Agreement shall cease to have effect six months after the receipt of such notification.

(3) In the event of termination of this Agreement, its provisions shall continue to apply in respect of any uncompleted separate implementing arrangements entered into during the period of validity of this Agreement.

\* Agreement entered into force on 23 August 1978.

In witness whereof, the undersigned, duly authorised thereto by their respective Governments, have signed this Agreement.

Done at Bonn on 2<sup>nd</sup> December 1977 in two originals, in the English and German languages, both texts being equally authentic.

For the Government  
of New Zealand  
Duncan MacIntyre

For the Government  
of the  
Federal Republic of  
Germany  
Peter Hermes

## Attachment 2

### Main Instruments of New Zealand–Germany Cooperation in Research and Development

Programme	Form of Activity	Delivery Agency	Projects / Activities per year (approx.)	Budget, per year (approx)
<b>Coordination</b>				
NZ–Coordinator for Germany (.5) of a Full–Time position	<ul style="list-style-type: none"> <li>• Advising MoRST</li> <li>• advising NZ researchers</li> <li>• co–administration of ISAT, DFG programmes</li> <li>• organisation of meetings, workshops</li> <li>• maintaining relationships with key NZ &amp; German partners</li> </ul>	MoRST	Not Relevant	\$95,000
MoRST Senior adviser (.2 FT)	<ul style="list-style-type: none"> <li>• Advising MoRST</li> <li>• maintaining relationships with key NZ–based partners</li> </ul>	MoRST	Not Relevant	Not available
Germany–Coordinator for NZ at IB	<ul style="list-style-type: none"> <li>• advising BMBF</li> <li>• advising German researchers</li> <li>• administration of IB/BMBF funding programme</li> <li>• organisation of meetings, workshops</li> </ul>	BMBF	Not Relevant	€20,000
NZ Science Counsellor for Europe	<ul style="list-style-type: none"> <li>• advising MoRST</li> <li>• working with the Coordinator</li> <li>• promoting NZ interests, capabilities in Germany</li> <li>• facilitating NZ–Germany linkages through FP7</li> </ul>	MoRST	Not Relevant	Not available

FRENZ service	<ul style="list-style-type: none"> <li>facilitating NZ–Germany linkages through FP7</li> </ul>	MoRST/ European Commission	Not Relevant	\$120,000
<b>Grants</b>				
DAAD–German Academic Exchange Service	<ul style="list-style-type: none"> <li>German Students to New Zealand</li> <li>New Zealand Students to Germany</li> </ul>	DAAD	200–250  30–50	\$250.000
AvH–Alexander von Humboldt Foundation	<ul style="list-style-type: none"> <li>German researchers to NZ</li> <li>NZ researchers to Germany</li> </ul>	AvH	1–2 up to 5	\$40,000
Julius von Haast–Fellowship	Programme for supporting long–term, recurrent visits by German researchers	MoRST / RSNZ	3	\$114,000
<b>International Linkage Programmes</b>				
BMVEL	Programme for project oriented mobility	BMVEL	5–10	€30,000 –50,000
IB/BMBF	Programme for project oriented mobility	IB/BMBF	1–3	€20,000 –30,000
ISAT Programme	NZ–Germany STC Agreement Programme	RSNZ	5–15	
MORST/DFG Arrangement Fund	Initiative fund to support workshops, visits, other activities	Coordinator /RSNZ	1–5	\$25,000
<b>Mainstream Funding</b>				
BMBF	All BMBF programmes are, in principle, open for international cooperation	BMBF	Not known	Not known
DFG	All DFG projects are, in principle, open for international cooperation	DFG	Not known	Not known

Foundation for RS&T investment programmes	All Foundation RS&T investment programmes are, in principle, open for international cooperation	NZ Gov'tment	Not known <sup>4</sup>	Not known
New Zealand Health Research Council	All HRC investment programmes are, in principle, open for international cooperation	NZ Gov'tment	Not known	Not known
Marsden Fund	All Marsden Fund investment programmes are, in principle, open for international cooperation	NZ Gov'tment	Not known <sup>5</sup>	Not known

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<sup>4</sup> Foundation data suggests that 18% of its research projects involve a German partner. As reporting on (potential) international collaborations is optional in Foundation bids, this estimate is likely to underestimate the real number of linkages.

<sup>5</sup> Data from the RSNZ, which manages the Marsden Fund, suggests that, 17% of its research projects involve a German partner.