

Productie 1

Collaboration agreement 2018 - 2020

Between

- 1) Stichting Economic Board Groningen, a legal entity established under the laws of the Netherlands having its registered office and its principal place of business at (9747 AN) Zernikepark 12, Groningen, the Netherlands (hereinafter referred to as "EBG") and duly represented for the present purpose by _____ and _____
- 2) Coöperatie SURF U.A., a legal entity established under the laws of the Netherlands having its registered office and its principal place of business at Moreelsepark 48, (3511 EP) Utrecht, the Netherlands, Chamber of Commerce no. 41182408 (hereinafter referred to as "SURF") and duly represented for the present purpose by _____ hereinafter also referred to as "Research Partner", and _____
- 3) Ericsson Telecommunicatie B.V., a legal entity established under the laws of the Netherlands, having its registered office and its principal place of business at Ericssonstraat 2, (5121 ML) Rijen, the Netherlands (hereinafter referred to as "Ericsson") and duly represented for the present purpose by _____ hereinafter also referred to as "Research Partner", and _____
- 4) Huawei Technologies (Netherlands) B.V., a legal entity established under the laws of the Netherlands having its registered office and its principal place of business at (1101 CM) Herikerbergweg 36, Amsterdam, the Netherlands (hereinafter referred to as "Huawei") and duly represented for the present purpose by _____ hereinafter also referred to as "Research Partner", and _____
- 5) KPN B.V., a legal entity established under the laws of the Netherlands having its registered office and its principal place of business at Maanplein 55, the Hague, the Netherlands (hereinafter referred to as "KPN") and duly represented for the present purpose by _____ hereinafter also referred to as "Research Partner", and _____
- 6) Vodafone Libertel B.V., a group company of VodafoneZiggo Group Holding B.V., a legal entity established under the laws of the Netherlands having its registered office and its principal place of business at Avenue Ceramique 300, 6221 KX, Maastricht, the Netherlands (hereinafter referred to as "VodafoneZiggo") and duly represented for the present purpose by _____ hereinafter also referred to as "Research Partner", and _____
- 7) Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek TNO (Netherlands Organisation for applied scientific research TNO), a legal entity by public law (i.e. the TNO-wet), duly organised and existing under the laws of the Netherlands with registered offices at Anna van Buerenplein 1, 2595, DA Den Haag, the Netherlands, hereinafter referred to as "TNO", legally represented by _____ hereinafter also referred to as "Research Partner", and _____

- 8) Hanzehogeschool Groningen, a legal entity established under the laws of the Netherlands having its registered office and its principal place of business at Zernikeplein 7, 9747 AS Groningen, the Netherlands (hereinafter referred to as "Hanzehogeschool") and duly represented for the present purpose by _____ hereinafter also referred to as "Research Partner", and
- 9) University of Groningen, also on behalf of the Centre for Information Technology (CIT), Broerstraat 5 9712 CP Groningen. The Netherlands, duly represented for the present purpose by _____, hereinafter referred to as: "RUG", hereinafter also referred to as "Research Partner", and
- 10) The State of the Netherlands, which has its seat in The Hague, represented by the Minister of Economic Affairs (hereinafter referred to as "the State"), legally represented in this matter by _____ hereinafter also referred to as "Support Partner";

The parties 2 – 9 jointly also referred to as "Research Partners",

The parties 1 – 10 also referred to as the "Parties" and each a "Party", as the case may be,

Recitals:

- A. EBG aims to strengthen the economy and employment in northern Groningen;
- B. EBG's support focusses on sustainable (economic) initiatives with a long term benefit for the region;
- C. Amongst the initiatives to achieve the aforementioned objectives, is the establishment of a 5G Field Lab (as defined below). This initiative is the result of a collaboration between the eight Research Partners, Support Partner and EBG (jointly also referred to as the so-called "Founding Fathers"), as stated above. The Field Lab provide businesses and organizations with the opportunity to deploy the latest generation of mobile communication in innovative applications which are typical and specific to a rural environment, such as agriculture, healthcare, environment, transport and energy;
- D. Parties shall strive to involve companies and inhabitants located in the northern Groningen region in all activities for the Program, as defined below, as much as possible;
- E. Each Research Partner is interested in gaining experience on innovative applications that use the latest generation of mobile communication in a rural environment;
- F. Each Research Partner is prepared to contribute technological expertise, assets and research capabilities to the establishment of the 5G Field Lab in northern Groningen, provided no strategic or otherwise commercially sensitive information is shared between competitors;
- G. The Research Partners each have considerable experience in the field of telecommunication and ICT research;
- H. A previous collaboration agreement was concluded by the Parties for the term 1 June 2016 – 31 December 2017 (the "2016 Agreement") for the purpose of the execution of the Program, as defined below, aiming to conduct high-quality and innovative research as

detailed in the Program Plan (Annex 1), as defined below, in order to ensure optimal transfer of knowledge and collaboration between the Parties;

- I. Parties wish to extend the Program by entering into this collaboration agreement in accordance with clause 14 of the 2016 Agreement, formalizing their intentions on the terms set out herein;
- J. As under the 2016 Agreement, the activities under this collaboration agreement shall be performed strictly in accordance with the applicable competition/antitrust laws and regulations and the Antitrust Protocol, attached to this agreement as Annex 2.

The parties hereby agree as follows:

Clause 1. Definitions

1.1 In this Agreement:

"2016 Agreement"	means the previous collaboration agreement concluded by the Parties for the term 1 June 2016 – 31 December 2017
"5G Field Lab"	means the 5G Lab and the 5G Test Sites;
"5G Lab"	means the 5G knowledge and test centre ('living lab') established in accordance with the Program Plan on the Zernike science park in Groningen (close to the EnTranCe energy transition centre), enabling knowledge institutes, non-profit organizations, start-ups and commercial companies to – without prejudice to the applicable antitrust laws and regulations - execute tests and experiments with the latest communication technology;
"5G Test Sites"	means the chosen test sites in northern Groningen where field tests can be carried out with 5G applications;
"Access Rights"	means licenses and use rights as described in Clause 9;
"Affiliate"	means any legal entity which is directly or indirectly controlling, controlled by or under common control with a Party by ownership of more than fifty percent (50%) of the votes or share capital.
"Agreement"	means this collaboration agreement between the Parties, including all Annexes;
"Annex"	means an annex to this Agreement;
"Antitrust Protocol"	The protocol attached to this Agreement as Annex 2;
"Assets"	means physical and/or virtual components, owned by a Party, that are part of a fixed or wireless telecommunication network, such as but not limited to antennas, radio transceivers, backhaul connections, gateways, user equipment, switches, routers, servers and applications;

"Background IP"	means the Intellectual Property Rights that are owned by or licensed to (with the right to sub-license) each Research Partner prior to the commencement of the Program Plan and / or acquired or developed by a Research Partner independently from the Program Plan but during the term of the Agreement, insofar as the use of these Intellectual Property Rights is necessary for the performance of the Program Plan and insofar a Research Partner is allowed under applicable mandatory laws to do so.
"Budget"	means an estimate of the total costs with regard to the performance of the Program Plan including a payment schedule as set out in the Program Plan;
"Clause"	means a clause of this Agreement;
"Confidential Information"	means any information including business information, Know How, Foreground IP and Background IP the Parties communicate to or share with each other in relation to the performance of the Program Plan, and which has been clearly marked or identified as "confidential";
"Contribution"	means the cash or in kind contribution to the Program Plan by the Parties as described in the Program Plan and specified in the Budget;
"Existing Know How"	means Know How that each Party owns prior to the commencement of the Program Plan or acquired or developed by a Party independently from the Program Plan but during the term of the Agreement ;
"Foreground IP"	means the Intellectual Property Rights arising from the performance of the Program Plan, excluding Background IP and Existing Know How;
"Founding Fathers"	The ten initial Parties to this Agreement, being the eight Research Partners, Support Partner and EBG;
"Know How"	means all know how, knowledge, information, drawings, designs, specifications, range-charts, photo's, models, processes, procedures, regulations, instructions, reports, , correspondence, as well as all other technical or commercial information, company information, research information, research results, data and documents of whatever nature, whether acquired verbally, in writing or on any (other) data carrier;
"Intellectual Property Rights"	means all rights relating to any copyright (auteursrecht), patent (octrooi), trade name (handelsnaam), trademark (merk), database (databank) , designs and models (teken- en modellen), utility models, chips, topography of semiconductor products (topografie van halfgeleiderprodukten) , including all claims, entitlements and applications for registration of any

	of these rights under the laws of the Netherlands and any similar or equivalent forms under any applicable law or jurisdiction;
"Joint Development Parties"	has the meaning ascribed thereto in Clause 8.2.2 below;
"Joint Foreground IP"	has the meaning ascribed thereto in Clause 8.2.2 below;
"New Know How"	means Know How that each Party acquires or develops in relation to the Program Plan during the term of this Agreement;
"Program Plan"	means the plan, describing the Program and setting forth all the goals and work to be performed by the Parties. The Program Plan is attached to this Agreement as <u>Annex 1</u> ;
"Program"	means the project entitled 5Groningen program as described in the Program Plan;
"Steering Group"	The steering group as described in the Program Plan ("Stuurgroep Founding Fathers"), in which all the Parties are represented.

- 1.2 In this Agreement headings are used for ease of reference only and shall not control or affect the meaning or construction of any Clause or provision hereof.

Clause 2. Execution and scope of the Program Plan

- 2.1 Parties wish to enter into this Agreement with the purpose of cooperating in the Program Plan, without any prejudice to the applicable antitrust legislation and in accordance with the Antitrust Protocol (Annex 2 to this Agreement). Subject to this provision, each Party shall carry out its obligations under the Program Plan on the terms as set out in this Agreement, aimed at the execution of the Program Plan.
- 2.2 The Program Plan aims to achieve the following goals:
1. Development of use cases that can be applied and tested as a pilot in the 5G Lab in northern Groningen.
 2. Design of several 5G Test Sites in northern Groningen that:
 - a. Are adapted to the available standards and requirements as specified by various international platforms for the telecommunication industry (e.g. NGNM and 3GPP);
 - b. Support the aforementioned use cases that are developed in accordance with the Program Plan;
 - c. Make use of the current available technical solutions for 5G mobile communication;
 - d. Are compliant with applicable data protection legislation.
 3. Maintenance and management of the 5G Lab.
 4. Offering potential participants in use cases an overview of the possibilities and capabilities of the 5G Lab, in conformity with anti-trust law.
 5. Deployment and/or management of several 5G Test Sites in northern Groningen, where (inter)national market parties in close cooperation with local businesses and

- residents, can execute pilot applications (use cases), that require the availability of 5G communication technology.
6. Attract companies and organizations to northern Groningen that want to pilot new applications in their industry because of the availability of an operational 5G Field lab, creating sustainable employment and economic activity in this region. .
 7. Development and dissemination of knowledge on 5G and its use for advanced applications thereby creating an internationally recognized centre of expertise on the potential and application of 5G technologies in Groningen for research and educational institutions.
- 2.3 The Program Plan forms an integral part of this Agreement and is attached as Annex 1 to this Agreement. The Steering Group may decide to amend and/or supplement the Program Plan from time to time. Upon the adoption by the Steering Group of a new version of the Program Plan, the new version will replace the former version as Annex 1 to this Agreement and will be added as such.

Clause 3. Responsibilities EBG

- 3.1 EBG has assigned a program manager 5G for the Program and will prolong this assignment for at least the duration of the Agreement;
- 3.2 EBG takes ownership of the Program, and will facilitate the program manager in the execution of the Program Plan, amongst others with reasonable office space, workstation and transport facilities;
- 3.3 EBG will select public and private organizations connected to the region of northern Groningen to participate in the Program, and stimulate them to develop applications that make use of the 5G Fieldlab;
- 3.4 EBG will periodically (at least annually) report and justify to the Research Partners and Support Partner how the Budget provided by the Founding Fathers is used for and in accordance with the Program Plan.

Clause 4. Contribution to the Program Plan

- 4.1 Each Research Partner shall contribute to the Program, in kind and/or in cash. The contribution in cash is set out in the Budget, as described in the Program Plan. The in kind contribution of a Research Partner will consist of either the contribution of Assets and/or through the participation of technical/research experts to assist in the design and architecture of the 5G Field Lab;
- 4.2 The in kind contributions of the Research Partners shall be further determined by the Research Partners after inventory by the Research Partners of the Materials and the assistance of technical/research experts required to perform the activities under the Program Plan and/or goals of this Agreement, in compliance with the Antitrust Protocol.
- 4.3 In the event of a contribution in cash, the contribution shall be paid in accordance with the payment schedule specified in the Budget, as described in the Program Plan.
- 4.4 All amounts are excluding VAT (in Dutch: Belasting Toegevoegde Waarde) insofar as applicable.
- 4.5 EBG shall use a contribution in cash for the performance of the Program Plan and the carrying out of the research as described in the Program Plan, in accordance with the Budget.

Clause 5. Accession of additional research partners

- 5.1 If during the term of this Agreement a third party wishes to accede to this Agreement and the Program Plan as an additional research partner, the following guidelines shall apply:
- The Founding Fathers must agree on the accession of the additional research partner. Such permission shall not be unreasonably withheld and shall comply with applicable antitrust legislation.
 - The Founding Fathers may attach conditions to their consent in order to secure that the contribution of all participating parties in the Program will be reasonably equal, provided that these conditions are compliant with applicable antitrust legislation.
- 5.2 The guidelines in this clause 5 are set out in more detail in the document entitled 'Accession to Collaboration Agreement 5Groningen', which is attached to this Agreement as Annex 3.
- 5.3 In the event that the Steering Group unanimously agrees on the accession of an additional research partner to this Agreement, a new version of this Agreement (which will include the additional research partner as a party but will be the same in terms of content) will have to be entered into by all the parties. Following such agreement, the Support Partner and Research Partners hereby authorize EBG to sign on their behalf the agreement with the additional research partner. EBG will provide each Party with a copy of the signed document.

Clause 6. Confidentiality

- 6.1 Each Party agrees to treat the Confidential Information as confidential and agrees not to disclose the same to any third party without the prior written consent of the Party or Parties providing the Confidential Information, without prejudice to the right of Parties to disclose all results of the Program Plan at any time under the terms as set out in Clause 7(Publication).
- 6.2 A Party may not disclose any of the Confidential Information to its own officers and employees (and those of its Affiliates) except to those officers and employees (and those of its Affiliates) directly engaged in the performance of this Agreement for whom it is necessary to know such information for the sole purpose of performing the obligations under this Agreement, and only to the extent necessary for this purpose. Prior to the disclosure of the Confidential Information, the relevant officers and employees of EBG and Research Partners will be required to agree in writing to keep the relevant Confidential Information confidential in accordance with the terms of this Agreement during and after the termination of their employment or other arrangement with the relevant Party, unless the employment agreements of such officers and employees already contain a sufficiently adequate confidentiality obligation.
- 6.3 Confidential Information may only be disclosed to third parties, not being officers or employees of a Party, in as far as such disclosure is necessary for the performance of the Program Plan and only after the third party has signed a non-disclosure agreement that has been approved by the Steering Group.

- 6.4 The obligations set out in Clause 6.1, 6.2 and 6.3 no longer apply where the Confidential Information:
- 6.4.1 is or becomes publicly known without the involvement of the receiving Party/Parties;
 - 6.4.2. at the time of receipt is already known to the receiving Party/Parties and is not subject to any (other) obligation of confidentiality, to be notified to the other Party immediately and to be proven on demand by sufficient written evidence;
 - 6.4.3 is rightfully made available to the receiving Party/Parties by a third party, and the intended use or disclosure by the receiving Party/Parties would not violate any restriction on use or disclosure binding on the receiving Party/Parties ;
 - 6.4.4 has been independently developed by the receiving Party/Parties, to be proven on demand by sufficient written evidence;
 - 6.4.5 is disclosed pursuant to the requirement of any statute or regulation or the order of any Court of competent authority. If such a situation occurs, Parties shall inform each other promptly of such requirement or order in order to assist in minimizing the disclosure.

Clause 7. Publication

- 7.1 EBG is entitled to issue official media statements ("persbericht") or other public communication regarding the Program Plan, provided that the draft media statement or other public communication has been approved in advance by the affected Parties. If any of the Research Partners and/or Support Partner wants to issue a media statement or wants to publish results relating to the Program, including but not limited to any Foreground IP, regardless of the form (whether oral, written or in any other (electronic) form), both during the term of the Agreement as well as after the termination thereof, the Research Partner and/or Support Partner shall request EBG's and the affected Parties' prior written permission to do so. Permission shall not be unreasonably withheld or delayed. A Party may request the publication to be delayed for a maximum of ninety (90) days from receipt of the publication for review, in order to apply for patent protection or other IPR protection of its Foreground IP, provided such delay is demonstrably necessary for such IPR protection. Parties may attach reasonable conditions to their consent. A publication by one Party shall not contain any Confidential Information of any other Party, unless approved in advance and in writing by the Party concerned.

Clause 8. Intellectual Property Rights - Ownership

- 8.1 *Ownership of Background IP*
Each Party shall remain the owner and shall retain control of the Background IP owned by it.
- 8.2 *Ownership of Foreground IP*
- 8.2.1 Foreground IP
Foreground IP shall be the property of the Party whose employees, researchers, research fellows, individuals equivalent to those persons make the inventive step, or the creative step (in case of non-patent IP), carrying out the work generating that Foreground IP. In the event that the Foreground IP consists of a modification, derivative or enhancement of hardware and/or software that is separately legally IP protectable, the ownership of such Foreground IP shall belong to the Party owning or controlling such hardware and/or software.

8.2.2 Joint Foreground IP

For any Foreground IP which is developed jointly by two or more of the Parties, the Parties that have jointly developed it (below the "*Joint Development Parties*") shall to the extent possible, endeavour to identify and separate the Joint Foreground IP into separate patentable or IP protectable Foreground IP developed solely by one of the Joint Development Parties. Such separately IP patentable or IP protectable Foreground IP shall be solely owned and be the sole property of the Joint Development Party who has developed it. In the event separation according to the previous two sentences identifies a Joint Foreground IP which cannot be separated into different IP protectable Foreground IP to be owned by one of the Joint Development Parties as now said, such Foreground IP shall be jointly owned by the involved Joint Development Parties ("*Joint Foreground IP*"). Each of the joint owners of the Joint Foreground IP is free to make, have made, use, have used, sell, offer to sell, lease, or otherwise dispose of any prototypes, products, methods or processes, and to provide pertinent services, license including the right to grant sub-licenses, and assign such joint results without the consent of and without accounting to the other jointly owning Party/Parties, save for Program Plan obligations and save for the restriction of entering into licensing agreements with the other Parties of the Program Plan.

8.2.3 In as far as the allocation of Foreground IP (including Joint Foreground IP) and related Access Rights in accordance with this clause 8 cannot be considered to adequately reflect the work packages and contributions of the respective Parties, they will negotiate in good faith an additional arrangement.

8.3 *Protection, maintenance and costs of Foreground IP*

8.3.1 Each Party is responsible for the application, acquisition and / or maintenance of its own Foreground IP and shall bear all costs relating to such application, acquisition and / or maintenance .

8.3.2 In the event of Joint Foreground IP, the Parties concerned are jointly responsible for the application, acquisition and/or maintenance of that Joint Foreground IP. Parties shall contribute in equal parts to the costs of application, acquisition and/or maintenance of the Joint Foreground IP, unless they agree otherwise.

8.3.3 In the event of Joint Foreground IP, each Joint Development Party shall, and shall ensure that its employees, researchers, research fellows, individuals equivalent to those persons, give full cooperation and shall execute all documents, deeds and so forth as may reasonably be required in connection with the application, acquisition and/or maintenance of that Joint Foreground IP.

Clause 9. *Access Rights*

9.1 Parties hereby grant each other non-transferrable, without the right to sublicense, non-exclusive, royalty free, Access Rights to the Background IP and Existing Know How contributed by them for the duration of the Program Plan to the extent technically necessary to enable the performance of the Program Plan for its duration, and to the extent that each Party is allowed under applicable mandatory laws and under the Antitrust Protocol to grant such Access Rights.

9.2 Parties hereby grant each other non-transferrable, without the right to sublicense, non-exclusive, royalty free, fully paid up Access Rights to the Foreground IP and New Know How owned by them, to the extent necessary to enable the performance of the Program Plan and to the extent each Party is allowed under applicable mandatory laws and under the Antitrust Protocol to grant such Access Rights.

- 9.3 If a Party needs Access Rights to Background IP or Existing Know How for the commercial use of its Foreground IP or New Know How, the other Party may grant that Party Access Rights on fair and reasonable market terms as applicable in the relevant international market to be further determined in good faith at that time, provided that a Party is allowed under applicable antitrust laws and under the Antitrust Protocol to do so. For the avoidance of doubt, a Party is not obligated to grant Access Rights to its Background IP or Existing Know How, other than those described in Clause 9.1 of this Agreement, unless a Party has an obligation under mandatory antitrust legislation to grant such Access Rights on FRAND terms.

Clause 10. Know How

- 10.1 Each Party shall remain the owner and shall retain control of Existing Know How owned by it.
- 10.2 All New Know How directly arising from the Program Plan under this Agreement shall belong to the Party whose employees, researchers, research fellows, individuals equivalent to those persons have developed it.

Clause 11. Assets

- 11.1 A Party may provide to the other Party/Parties Assets to be used for the purposes of the Program Plan.
- 11.2 Each Party shall remain the owner and shall retain control of the Assets owned by it and is not under any obligation to transfer such Assets to any other Party/Parties. In the event that state aid laws and regulations and/or applicable eligibility conditions prescribe a transfer of Assets to a legal entity operating the 5G Field Lab, the relevant Parties shall confer on the (additional) arrangements necessary in order to comply with such laws and regulations and/or eligibility conditions.

Clause 12. Liability and Indemnification

- 12.1 Parties will perform the Program Plan in accordance with all applicable laws and regulations and to the best of their abilities. Each Party does not guarantee the usefulness, completeness or correctness of the results obtained under the Program Plan nor the consequences of the use thereof.
- 12.2 The use of the results of the Program Plan by a Party is at its own risk.
- 12.3 The total liability of each Party, for any reason whatsoever, shall be limited to compensation for the following damage and to the maximum amounts stated from case to case:
- a. death and personal injury: up to a maximum of EUR one and a half million (1,500,000) per event, with a series of interrelated events counting as one event;
 - b. damage to property: reasonable costs of repair or replacement, up to a maximum of EUR two hundred fifty thousand (250,000) per event, with a series of interrelated events counting as one event;
 - c. reasonable costs demonstrably incurred for prevention of limitation of damage: up to a

maximum of EUR fifty thousand (50,000) per event, with a series of interrelated events counting as one event.

d. in respect of any proven damage or loss to the other Party caused by its unauthorised use or disclosure of such information as mentioned in article 6, up to the sum of EUR two hundred fifty thousand (250,000) per event.

Damage referred to above in b, c and d shall be subject to an absolute maximum of EUR five hundred thousand (500,000) for the term of the Agreement.

- 12.4 The limitations of liability stated in this Clause 12 shall not apply in the case of damage caused deliberately or through intentional misconduct (in Dutch "opzet of bewuste roekeloosheid") by the managing board of a Party.
- 12.5 No Party shall be liable for damages not mentioned in this Clause 12, including but not confined to lost profits, loss of production, missed savings, loss of data, damage through stagnation of operations, de-staffing, penalties and charges owed to third parties and impaired goodwill.
- 12.6 Research Partners will indemnify EBG against any claims, damages and expenses resulting from or in relation to an (alleged) infringement of any rights of third parties by/through the (use of) Background IP, Foreground IP, Joint Foreground IP, Existing Know How or New Know How of those Research Partner(s) concerned.

Clause 13. No warranties

- 13.1 All Background and Foreground IP, Know How and Confidential Information made available in the context of this Agreement is made available "as is" and each Party understands and agrees that such Background and Foreground IP, Know How and Confidential Information may be experimental in nature and is made available without any representation or warranty, express or implied, including any implied warranty of merchantability, satisfactory quality or fitness for any particular purpose.

Clause 14. Term and termination

- 14.1 The Agreement commences on 01-01-2018 and terminates on 31-12-2020 (the "Termination Date").
- 14.2 In the event of bankruptcy (faillissement), a moratorium of payments (surseance van betaling) or the entering into a debt rescheduling arrangement (schuldsaneringsregeling) of one of the Parties, that Party's participation to the Agreement will automatically end in the sense that that Party from the date of the occurrence of the relevant event is no longer a party to the Agreement. Such termination of the participation by an individual Party will not affect the validity of the Agreement between the remaining Parties.
- 14.3 In the event that a Party wishes to withdraw from the Agreement prior to the Termination Date, that Party will submit its intention to terminate its participation to the Agreement to the other Parties in the Steering Group. The Parties will negotiate in good faith how the withdrawal of one of the Parties will cause the least disadvantage to the Program Plan as reasonably possible.
- 14.4 Any payment obligations (in cash) of the terminating Party relating to the year of its withdrawal from the Agreement remain due and payable and payments already made by that Party will not be refunded, unless maladministration or financial misconduct on the part of EBG has been shown objectively.

Clause 15. Use of logo and name Parties

None of the Parties are entitled to use the logo and name of any of the other Parties or any of their respective employees or staff members for commercial purposes without prior written consent of the Party concerned. A Party may attach conditions to its consent.

Clause 16. Contact Persons

16.1 Parties hereby appoint the hereunder mentioned persons as their respective contact person:

Economic Board Groningen	
SURFNet	
Ericsson	
Huawei	
The State (Agentschap Telecom)	
KPN	
Hanzehogeschool Groningen	
TNO	
VodafoneZiggo	
University of Groningen	

16.2 Parties are obligated to inform each other at shortest notice on changes in their contact persons.

Clause 17. Miscellaneous

- 17.1 The conclusion of this Agreement and the rights and obligations deriving thereof will in no way constitute a legal entity (rechtspersoon) or any other form of corporate entity (juridische entiteit) and Parties do not intend to create any such legal entity or corporate entity.
- 17.2 All provisions of this Agreement which by their terms or nature have effect following its expiry or termination, as the case may be, shall survive the expiry or termination of the Agreement.
- 17.3 Neither Party may assign any of its rights and obligations under this Agreement to a third party without the prior written consent of the other Parties. Permission shall not be unreasonably withheld or delayed.
- 17.4 If any provision of this Agreement (including its Annexes) is held invalid based on a definitive court verdict, the remaining provisions shall not be affected thereby.

Clause 18. Governing law and jurisdiction

- 18.1 This Agreement is governed by and has been construed in accordance with the laws of the Netherlands.
- 18.2 All disputes that might arise as a result of or in relation to this Agreement, or of further agreements, will be exclusively submitted to the competent court in Rotterdam, the Netherlands.

[signature pages to follow]

Signature page 5Groningen Collaboration Agreement 2018-2020, 12 December 2017, version 1.0

Executed by EBG:

For and on behalf of:
EBG

On: 2017
Signature:.....

Executed by SURF:

For and on behalf of:
SURF

On: 2017
Signature:.....

Executed by Ericsson:

For and on behalf of:
Ericsson

On: 2017
Signature:.....

Executed by Huawei:

For and on behalf of:

Title: CEO (NL)

On:

2017

Signature:.....

Signature page 5Groningen Collaboration Agreement 2018-2020, 12 December 2017, version 1.0

Executed by KPN:

For and on behalf of:
KPN

On: 2017
Signature:.....

Signature page 5Groningen Collaboration Agreement 2018-2020, 12 December 2017, version 1.0

Executed by TNO:

For and on behalf of:

TNO

On: 2017

Signature:.....

Executed by VodafoneZiggo:

For and on behalf of:
VodafoneZiggo

On: 2017
Signature:.....

Executed by the State (Agentschap Telecom):

For and on behalf of:
the State (Agentschap Telecom)

On: 21 December 2017
Signature

Executed by Hanzehogeschool:

For and on behalf of:
Hanzehogeschool

On: 2017
Signature:.....

Executed by University of Groningen:

For and on behalf of:
University of Groningen

On: 2017
Signature:.....

Annex 1: Program Plan

Programmaplan 5Groningen, versie 0.5 dated 15-11-2017

5G
5G

Annex 2: Antitrust Protocol

By taking part in the Program each Party has agreed to be guided by the content of this protocol as a condition of its participation in the Program and to conduct all activities connected with the Program in accordance with applicable antitrust laws and regulations.

The Research Partners shall work individually on the design and deployment of the 5G Field Lab. In the event Research Partners wish to change this into a more intensive way of collaboration which would lead to sharing of e.g. (strictly technical) information, the Research Partners involved must each perform a prior assessment with respect to any potential antitrust issues. Any further collaboration must be performed in accordance with applicable antitrust laws and regulations.

Participation in the Program does not preclude participation in alternative or competing programs or activities.

In the unlikely event that a Party does not comply with this Anti-Trust Protocol, the participation of that Party to the Agreement will be suspended or terminated.

The content of this Protocol shall, amongst others, be applicable to:

- a) the meetings and any other communication that will take place under this Agreement;
- b) any emails exchanged in relation to the Program;
- c) any document prepared in relation to or as a result of the Program.

For the purposes of this 'Annex 2: Antitrust Protocol', the following distinction will be used: "Non-Commercial Parties" means EBG, the State (Agentschap Telecom), TNO, Hanzehogeschool, RUG, and SURF. All other parties shall jointly be referred to as "Commercial Parties" and individually as a "Commercial Party".

Meetings and other communication

The main rules in this context are the following:

- Research Partners shall not exchange information which could give an indication of their respective intended future market behaviour, or any other strategic or sensitive information in breach of any applicable antitrust laws and regulations. Strategic or sensitive information includes amongst others individualized information about: pricing or other terms or conditions of sale at either wholesale or retail level, costs (such as purchase costs, production costs), margins, quantities, market shares, capacity, quality, marketing plans, investments, customer lists, R&D, performance, strategy, distribution capabilities, technical capabilities.
- Each Party will only address or discuss topics which are necessary to carry out the Program. No other topics will be raised or addressed. No discussions will be held on (commercially) sensitive strategies of either of the Parties. No Party will disclose any information on technical or commercial plans.
- Progress reports will only be distributed amongst the Non Commercial Parties. Each Commercial Party will only receive information on the pilot projects that they are participating in. If necessary under applicable antitrust laws and regulations, Commercial Parties will not simultaneously attend meetings of the Steering Group, Project Group and other meetings.
- Each Party has the responsibility of ensuring that their behaviour complies with this Protocol. Taking turns, one of the legal counsels or compliance officers of the Research Partners – or an external legal counsel with an expertise in antitrust law - shall attend all

meetings in order to supervise compliance with this Protocol and shall, (un)requested, provide compliance reminders concerning this Protocol during the meetings. Whether or not the presence of a legal counsel or compliance officer is necessary will be assessed by the Research Partners prior to each meeting based on the agenda and at least one week in advance.

It is the responsibility of each Party to signal antitrust issues in case they arise and to take appropriate measures.

Duties of the Program Manager 5G:

- Ensure that agendas state that the meeting will be conducted in accordance with this Protocol and antitrust law.
- Ensure that the agenda and accompanying documents are distributed to and are approved by the legal counsels of the Commercial Parties prior to distributing these to the Parties.
- Ensure that the agenda will be distributed to all Parties prior to each meeting, including a list of participating and absent Parties.
- Ensure that meeting agendas are strictly adhered to or any amendment explicitly agreed by all Parties and noted.
- Ensure that minutes reflect the true content of the discussion and the language used must be clear, concise and accurate. A list of Parties present and absent must be included.
- Ensure that meeting minutes are circulated to all Parties afterwards, within one week after each meeting. Meeting minutes should be carefully checked and approved by all Parties and impreciseness or mistakes should be noted and corrected.
- Ensure that, if a regulatory or antitrust authority would require information concerning the Program documents or activities, all Parties are immediately informed, insofar this is legally permitted under the applicable antitrust or other laws and regulations.

Duties of the compliance officer / legal counsel present at a meeting:

Notwithstanding the responsibility of Each Party as stated under the 'main rules regarding Meetings':

- Ensure that the meetings of the Program are compliant with all applicable antitrust laws and regulations.

Document management:

All storage of documents, which are created or received by the Parties should comply as follows:

- All final, authoritative documents, including meeting minutes, should be kept for as long as (legally) necessary.
- Specific legal retention requirements may apply to certain types of documents and should be complied with.

Annex 3 to Collaboration Agreement 5Groningen

Accession to Collaboration Agreement 5Groningen

Background / reason for addendum

- A number of parties have expressed interest in participating in the 5Groningen project (including IBM, Volker Wessels and others).
- The Collaboration Agreement of 9 June 2016 (hereinafter: 'the Agreement') has an open character. This is the wish of the parties to the Agreement and also a requirement under applicable competition laws and regulations.
- The accession and governance procedure deserve further elaboration in order to facilitate this effectively, following on from or as further implementation of Article 5.1 of the Agreement: 'Accession of additional research partners'.

The Agreement has three types of 'partners', namely: a. the Economic Board Groningen ('EBG'), b. the State (Agentschap Telecom), and c. the other partners, referred to as 'Research Partners'. The partners referred to under a, b and c are jointly referred to as 'Partners'. All Partners are represented in the steering group of the 5Groningen project ('the Steering Group').

Proposal for accession scheme for new research partners

A prospective research partner ('Prospective Research Partner') can make its interest known through one of the existing Partners, however its interest will only be formally confirmed when the Prospective Research Partner has made its interest known in writing through or to the Programme Manager (PM) of 5Groningen.

The Prospective Research Partner must include details of the following in this written notice:

- the reasons for its interest in participating in the project;
- what the Prospective Research Partner can contribute (contribution);
- what the Prospective Research Partner anticipates receiving from 5Groningen (benefit);
- how the Prospective Research Partner wishes to connect its name/logo with 5Groningen (promotion/communication), and
- confirmation that the Prospective Research Partner is willing to conform to the Agreement, including its appendices.

Decision-making

- At the PM's proposal and upon making the aforementioned written notice available, the Steering Group will decide on admitting the Prospective Research Partner as a party to the Agreement, and consequently as a member of the Steering Group. The proposal will be communicated to the Steering Group at least four weeks prior to the Steering Group meeting in which the decision will be made.
- Both in the case of approval or rejection of the request to participate, the decision will be communicated, with reasons, to the Prospective Research Partner.

- If the Prospective Research Partner does not agree with the decision, it may ask EBG to be permitted to submit within a period of no more than four weeks a new and/or alternative request to participate to the Steering Group. EBG is free to decide whether or not to honour this request.

The Steering Group will bear the interests of the Prospective Research Partner and the interests of 5Groningen in mind when considering the request. Particular attention will be given to:

- that stated in the Agreement (in particular Article 4);
- the question whether the Prospective Research Partner can make a demonstrable contribution to achieving one or more of the objectives of the 5Groningen project as referred to in Article 2.2 of the Agreement;
- the question whether the contribution of the Prospective Research Partner will encompass more than one pilot;
- the question whether the contribution of and benefit for the Prospective Research Partner reasonably compares with the contribution of and benefit for existing Research Partners;
- the size of the Prospective Research Partner (e.g. in proportion to its turnover, personnel) compared to the intended contribution and benefit: less can be expected from a small, local business than from larger companies/internationals;

In weighing up the interests and assessing the request to participate, the frameworks of the applicable competition/anti-trust laws and regulations will be strictly adhered to. This also means that the commercial Research Partners/ Prospective Research Partners will have no substantive knowledge of the intended contributions of the other commercial Research Partners / Prospective Research Partners.

Productie 2



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Programmaplan roningen

Fase 1 : Discover

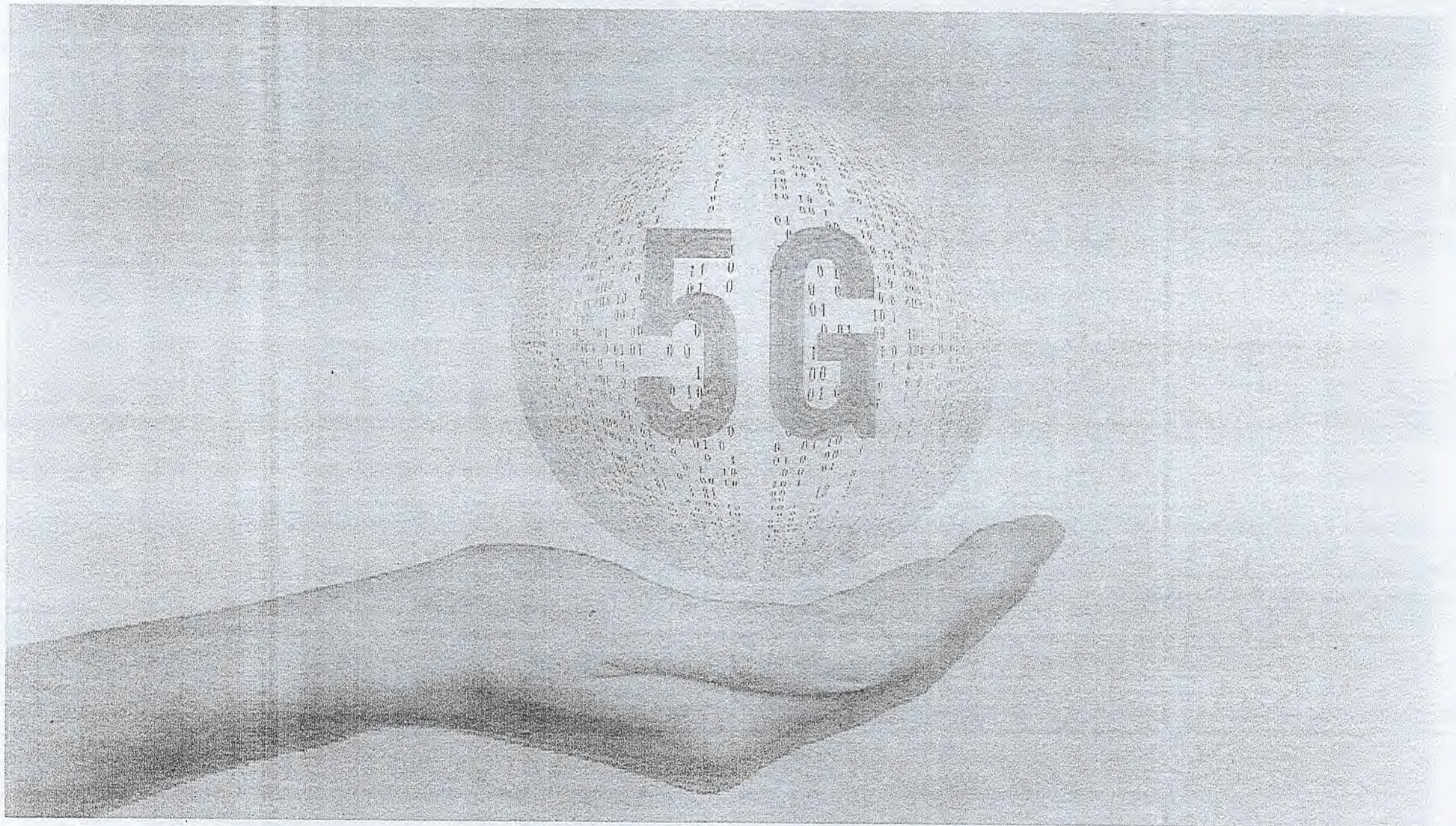
Versie 1.1

10 maart 2016

A white, irregular redacted area is located below the date.



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5Groningen - Inleiding

Een HD film downloaden op je telefoon terwijl je met je ogen knippert... artsen die op afstand, maar 'real time' de bloedwaarden van hun patiënten kunnen monitoren... zelfrijdende auto's en landbouwmachines... een duizendvoud aan apparaten en sensors die met elkaar verbonden is om nog meer, nog beter te meten en regelen. Dit alles en meer wordt straks mogelijk met de nieuwe generatie draadloos internet: 5G.

Voor consumenten is dit nog toekomstmuziek en we zullen nog minstens 5 jaar moeten wachten voordat 5G op de markt komt. In de tussentijd werken bedrijven en kennisinstellingen keihard om deze nieuwe vorm van razendsnel mobiel internet mogelijk te maken. Dat doen ze uiteraard achter computers, maar ook in testgebieden buiten hun laboratoria, in zogenaamde fieldlabs. Tot op heden gebeurt dat uitsluitend in grote steden, waar veel gebruikers dicht op elkaar wonen.

Maar het is ook belangrijk dat 5G getest wordt in een landelijk gebied en waar kan dat nu beter dan in Noord-Groningen. Deze regio is strategisch gelegen tussen een internationaal bekende onderwijsstad en een ambitieuze haven waar een enorme trans-Atlantische glasvezelkabel uit de VS aan land komt. Noord-Groningen heeft een grote hoeveelheid toptalent en een uitstekende infrastructuur.

Private en publieke partijen hebben zich verenigd in een internationaal uniek experiment, waarbij in een groot landelijk gebied 5G kan worden doorontwikkeld en waar de nieuwste toepassingen kunnen worden uitgetest.

Dit programmaplan betreft de aanpak waarop het 5G Fieldlab wordt gerealiseerd en hoe toepassingen voor gebruik ervan worden ontwikkeld. Daarbij staat vooral de eerste fase, genaamd Discover, centraal.

Inhoudsopgave



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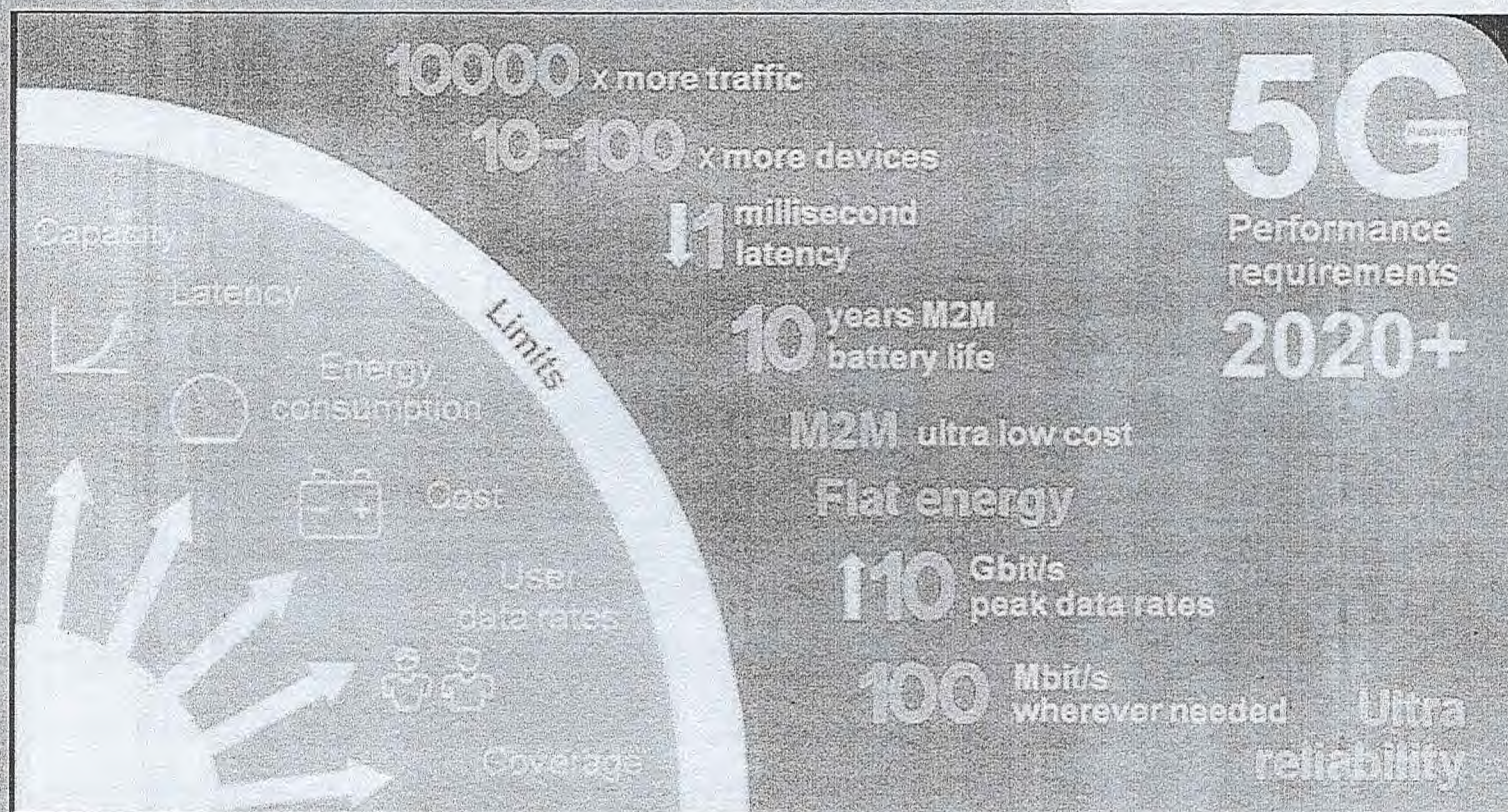
1. Context
2. Programma doelstelling
3. Fasering programma
4. Programma besturing
 - a. Organisatie – vijf thema's
 - b. Planning
 - c. Begroting
 - d. Informatie
 - e. Kwaliteit
5. Risico analyse
6. Bijlage: Facts & figures 5G



5G Groningen – Wat is 5G?



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5Groningen – Waarom?



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Probleem

- Nog weinig burgers, bedrijven, kennisinstellingen en overheden zijn betrokken bij de snelle ontwikkeling van 5G mobiele internet, waardoor de waardevolle mogelijkheden die deze technologie mogelijk gaat maken langer op zich laten wachten.

Vraag

- Hoe kunnen we alle mogelijke begunstigden van 5G technologie betrekken bij de ontwikkeling, zodat er tijdig nieuwe en waardevolle diensten kunnen ontstaan?

Oplossing

- Met 5Groningen creëren we een fysieke en virtuele omgeving waar alle stakeholders 5G kunnen ontdekken, maken en gebruiken - Discover, Make & Use 5G in Groningen.

5Groningen – Wat is het?



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5Groningen is een fysieke en virtuele testomgeving in Noord-Groningen voor het ontdekken, maken en gebruiken van oplossingen gebaseerd op 5G mobiel internet technologie

Discover, Make & Use

5G in Groningen



5Groningen - Programma doelstellingen

1. Uitwerken van toepassingen (use cases) die eerst getoetst en later fysiek kunnen worden getest in het 5G Fieldlab in Noord-Groningen. Ze sluiten optimaal aan bij de karakteristieken van dit landelijke gebied.
2. Ontwerpen van een 5G Fieldlab in deze regio waarbij
 - Maximaal wordt aangesloten bij de reeds uitgewerkte en door internationale platforms (bijv. NGMN, 3GPP) gedragen 5G requirements
 - Optimaal wordt aangesloten bij de use cases die door deelnemers van de 5G pilot zijn ingebracht
 - Gebruik wordt gemaakt van de huidige beschikbare stand van techniek voor 5G
3. Opzetten van een permanent kenniscentrum 5G ('living lab' op het Zernike Campus, Groningen), waar kennisinstituten, start-ups, organisaties en bedrijven praktijktesten kunnen uitvoeren met de nieuwste mobiele communicatie technieken.
4. Implementeren van een nationaal 5G Fieldlab in Noord-Groningen, waar (inter)nationale marktpartijen, in nauwe samenwerking met bedrijven en bewoners uit de regio, de toepassingen (use cases) kunnen testen die de beschikbaarheid van 5G vergen.
5. Aantrekken (liefst permanent) van bedrijven en organisaties naar het gebied die vanwege de beschikbaarheid van een werkend 5G Fieldlab nieuwe toepassingen in hun sector willen uitproberen. Doel is blijvende werkgelegenheid en verbetering leefbaarheid in de regio.

5Groningen – Fasering



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Discover

Ondersteunen, promoten en verkennen van 5G technologie plus de mogelijke toepassingen hiervan. Oprichten van het virtuele en fysieke 5G "field-lab" in Groningen is onderdeel van deze ontdekkingsfase

2016

Make

Op basis van ideeën uit de Discover fase testen van geselecteerde 5G toepassingen in virtuele en fysieke "field-lab" van 5G. Deze test projecten geven de eerste praktische ervaringen met 5G technologie

2017

Use

Na het verkennen en testen van de mogelijkheden gaan we in de Use fase over tot grootschalige implementatie van 5G projecten in het "field-lab" in Groningen

2018

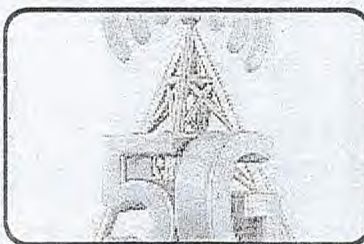
5Groningen – Fase Discover

- zoveel mogelijk parallel uitvoeren -



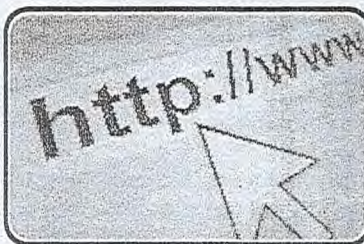
1. Uitwerken use cases 5G

- Uitwerken use cases in 5 thema's die relevant zijn voor het gebied: Energie, Zorg, Landbouw, Leefomgeving, Verkeer & Logistiek
- De thema's worden uitgewerkt in multidisciplinaire teams met innoverende deelnemers uit het werkveld, onderwijsinstututen (Hanze en RUG), creatieve innovators ('imagineers') en 5G experts.



2. Basis architectuur 5G Fieldlab

- Asset inventory: Welke componenten worden ingezet (bijv. Core netwerk Fraunhofer)
- Welke 5G requirements zijn haalbaar met de huidige stand van de techniek (bijv. latency)
- Welke devices komen wanneer beschikbaar?
- Welke soort input is er nodig van de use case groepen om fase 2 (Make) te kunnen starten



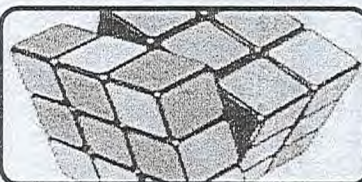
3. Opzetten Collaboration Platform 5Groningen

- Voor informatieverstrekking aan iedereen die meer over het 5Groningen initiatief wil weten
- Voor kennisdeling en collaboration tussen de deelnemers en teams in het programma
- Voor virtuele testen van 5G toepassingen (virtueel fieldlab)
- Het platform kent een open gedeelte (website) en een besloten deel (intranet)

roningen – Fase Discover (vervolg)

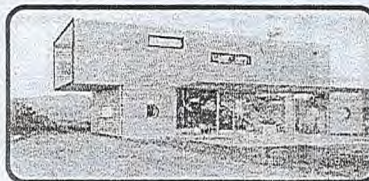


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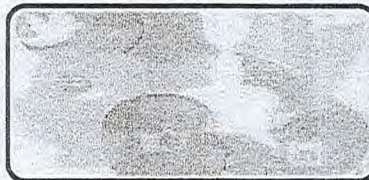
4. Challenge sessies waarin de kansrijke use cases worden geselecteerd

- Presenteren use cases in pitches per thema
- Review en selectie (criteria uitwerken)
- Voorbereiden MAKE fase kansrijke use cases



5. Faciliteiten 5G kenniscentrum ('living lab') op Zernike complex organiseren

- Voor testen en experimenten met 5G toepassingen
- Huisvesting in samenwerking met BuidInG en/of EnTranCe en/of Digital Society Lab
- Invulling in samenwerking met RUG en Hanzehogeschool



6. Communicatie & PR



7. Subsidies en funding voor MAKE initiatieven

Groningen - vijf thema's

De toepassingen die met 5G gaan werken moeten relevant zijn voor Noord-Groningen. Ondernemers en organisaties uit deze regio worden gemobiliseerd om innovatieve ideeën en plannen aan te dragen, die gebruik maken van 5G. Deze ideeën worden uitgewerkt in "use cases". In de Discovery fase wordt gestart met vijf thema's die kansrijk zijn en relevantie hebben voor deze rurale regio:

1. Landbouw
2. Zorg
3. Energie
4. Verkeer & logistiek
5. Leefomgeving

Voor ieder thema wordt een team samengesteld waarin op een Agile wijze, via workshops en brainstormsessies, die use cases worden uitgewerkt. Deze teams zijn multidisciplinair en bestaan uit maximaal 9 personen. De ideale mix is:

- **Thematrekker** – Organiseert team meetings, inspireert, faciliteert, stimuleert, creëert output
- **Materiedeskundigen** (3-5) – Komen bij voorkeur uit de regio, vertegenwoordigen ondernemers en organisaties uit de sector, zijn innovatief ingesteld
- **Imagineers** (1-2) – Creatieve innovator. Heeft affiniteit met het onderwerp, out-of-the-box denker, liefhebber techniek, denkt in oplossingen, pionier
- **5G expert** – weet alles van de nieuwste technieken op het gebied van mobiele communicatie

5Groningen – vijf thema's



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Zorg

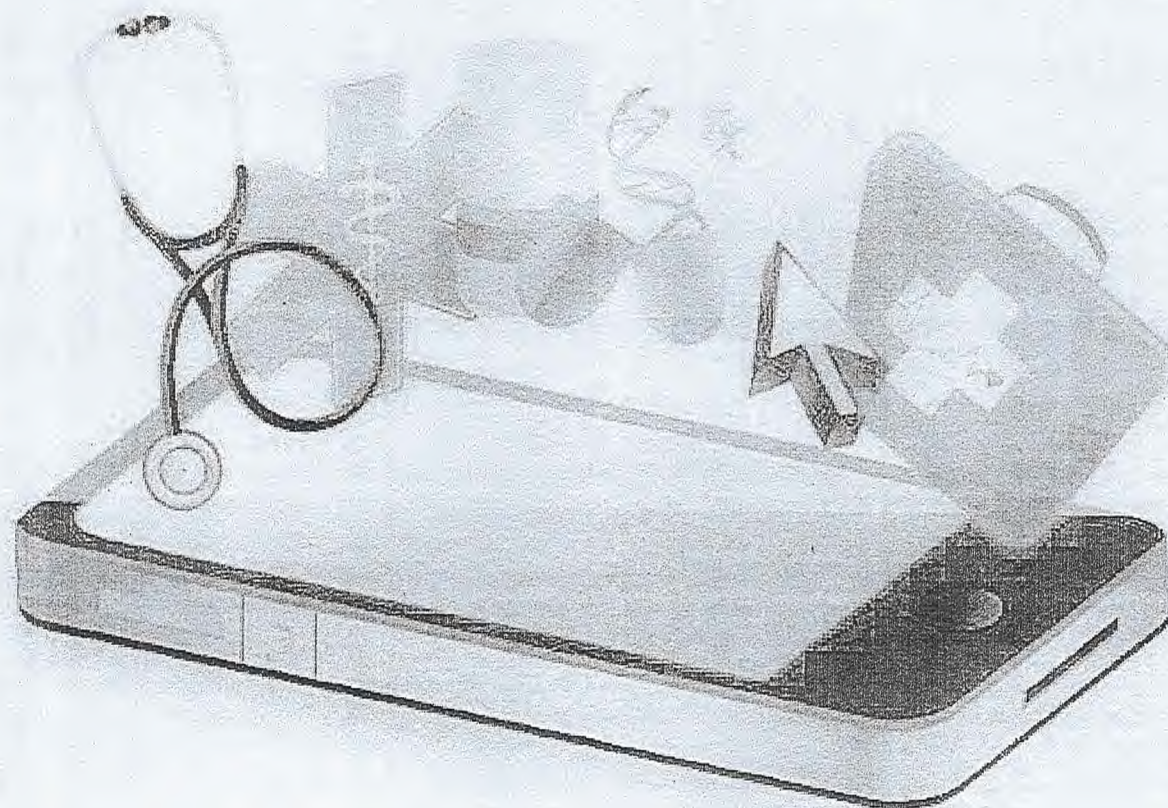
Verkeer
&
Logistiek

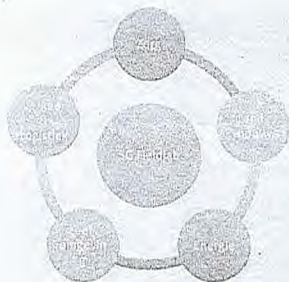
Land-
bouw

5G
Fieldlab

Leef-
omgeving

Energie





Team Zorg



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Thema owner eHealth

[Redacted] (Center of Expertise Healthy Ageing – Hanzehogeschool)

Materiedeskundigen

[Redacted] (Ambulnacezorg Groningen)

- UMCG Innovatie

- UMCG UCO

- Stichting De Hoven

- Zorg innovator

- UMCG

- Groninger Dorpen

(Arts & Zorg)

[Redacted] (RUG Healthwise)

Imagineers

[Redacted] (Hanzehogeschool)

[Redacted] (WildSea)

5G expert

[Redacted] (KPN IoT)

roningen - Landbouw





Team Landbouw



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Thema owner Agriculture

[redacted] (Weister Klap Advies)

Materiedeskundigen

[redacted] (akkerbouwer)
 [redacted] (veearts)
 [redacted] (veearts / Universiteit Utrecht)

[redacted] (akkerbouwer)
 [redacted] (melkveehouder)
 [redacted] (TNO)

Imagineers

[redacted] (Test Consultancy Group)
 [redacted] (Dronetoepassing)

[redacted] (Prov. Groningen)

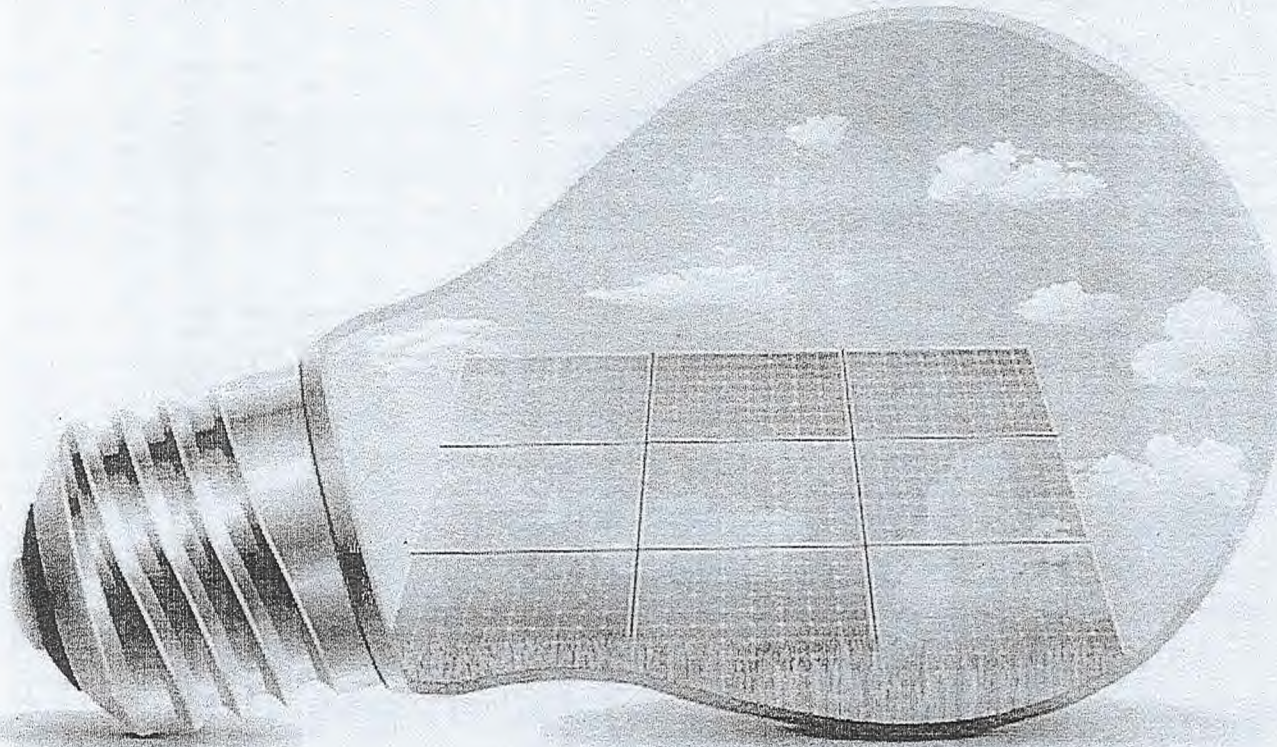
5G expert

[redacted] (Agentschap Telecom)
 [redacted] (Huawei)

5Groningen - Energie



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groningen



In Noord-Nederland zijn allerlei initiatieven gestart voor de transitie naar duurzame energie. **EnTrance** is een onderdeel van de Energy Academy Europe en een belangrijke proeftuin voor toegepast onderzoek. Hier bouwen bedrijfsleven, ondernemers en onderwijs aan de energievoorziening van morgen.



Team Energie



economic board
 groningen

Thema owner Energy

(Sinz)

Materiedeskundigen

(Groningen Seaports)

(EnTranCe)

(TNO)

(Enexis)

(Grunneger Power)

(GasTerra)

(NLD Energie)

(i-NRG)

EnTranCe)

(Energy Valley)

Imagineers

(EnTrance)

(Embed Engineering)

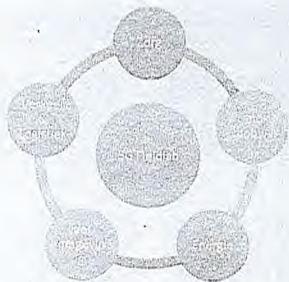
5G expert

(Huawei)

5 Groningen - Leefomgeving



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Team Leefomgeving



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Thema owner Environment

(Medusa Sensing)

Materiedeskundigen

(seismisch sensing expert)

(Groningen Seaports)

(Waterschap Noorderzijlvest)

(Landschapsbeheer

Groningen)

(Hanzelanaamcollege)

Imagineers

(Embed Engineering)

(Multimediamarkers)

(KPN)

5G expert

(Surfnet)

5 Groningen - Verkeer & Logistiek



10-03-2016 - v 1.1

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Team Verkeer & Logistiek



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Thema owner Traffic

Materiedeskundigen

(Regio Gn-Assen)

(Groningen Seaports)

(UvATesla minor)

(Wagenborg Shipping BV)

(Regio Gn-Assen)

(RDW)

(RDW)

Imagineers

(Ericsson)

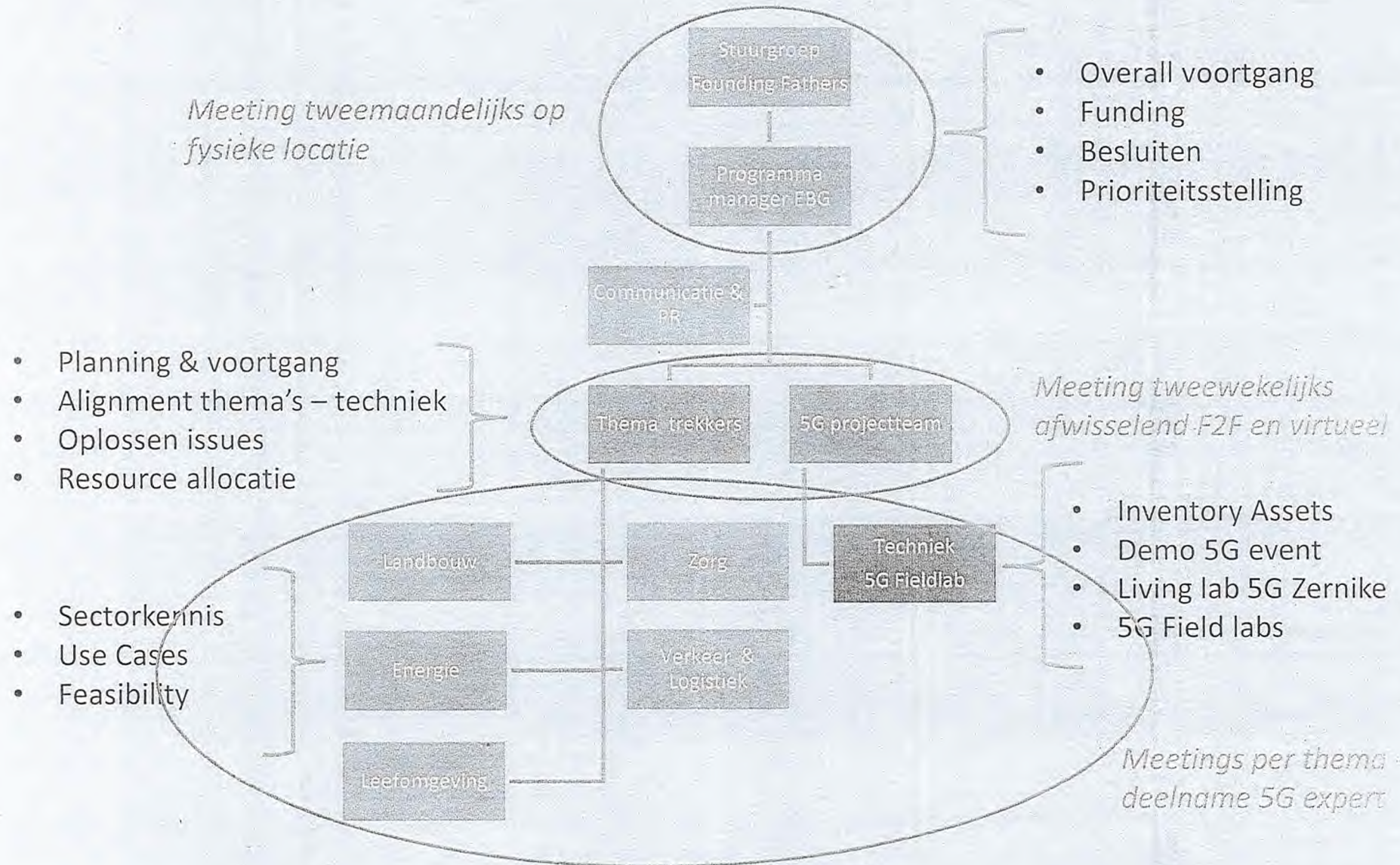
(Hanzehogeschool)

5G expert

(Ericsson)

Programma 5Groningen

- governance -



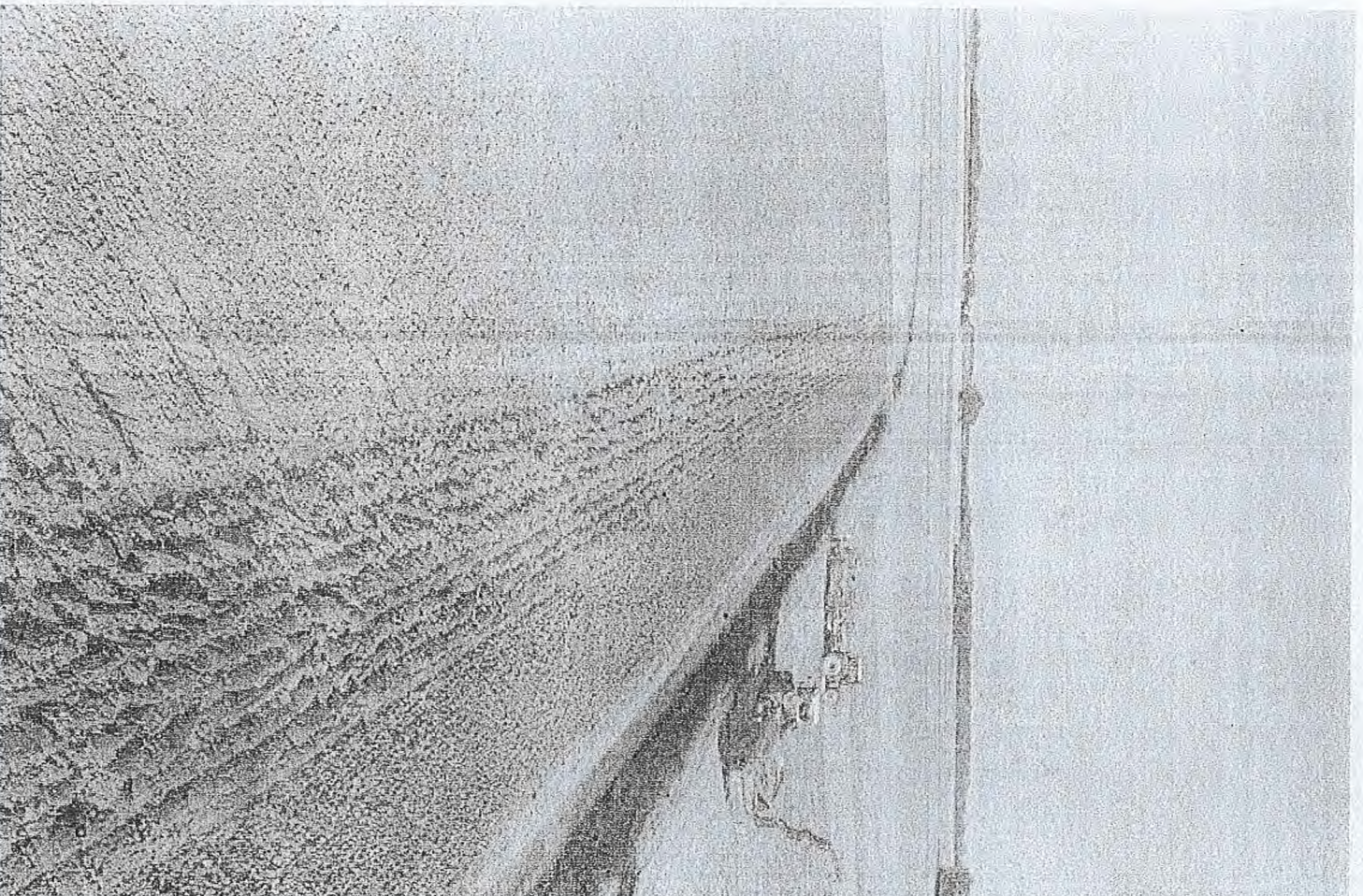
5G-roningen - programma besturing

Voor de vijf thema's worden in de fase Discover allerlei toepassingen uitgewerkt die leiden tot use cases. Parallel daaraan worden design en architectuur van het 5G Fieldlab opgesteld in het centrale team. Er is een continue verbinding tussen de thema-teams onderling en met de leden van het 5G Fieldlab team door:

1. De deelname van een 5G expert in elk van de thema teams
2. Periodieke update-meetings met de trekkers van de thema's, de technical lead van het 5G Fieldlab en de programma manager 5G

Het tempo van de thema-teams kan verschillen, zeker omdat het een creatief proces betreft, maar ook omdat de beschikbaarheid van de deelnemers varieert. Zo zullen de akkerbouwers vanaf medio maart al hun tijd weer in hun bedrijf moeten steken vanwege de start van de landbewerking- en zaaiperiode.

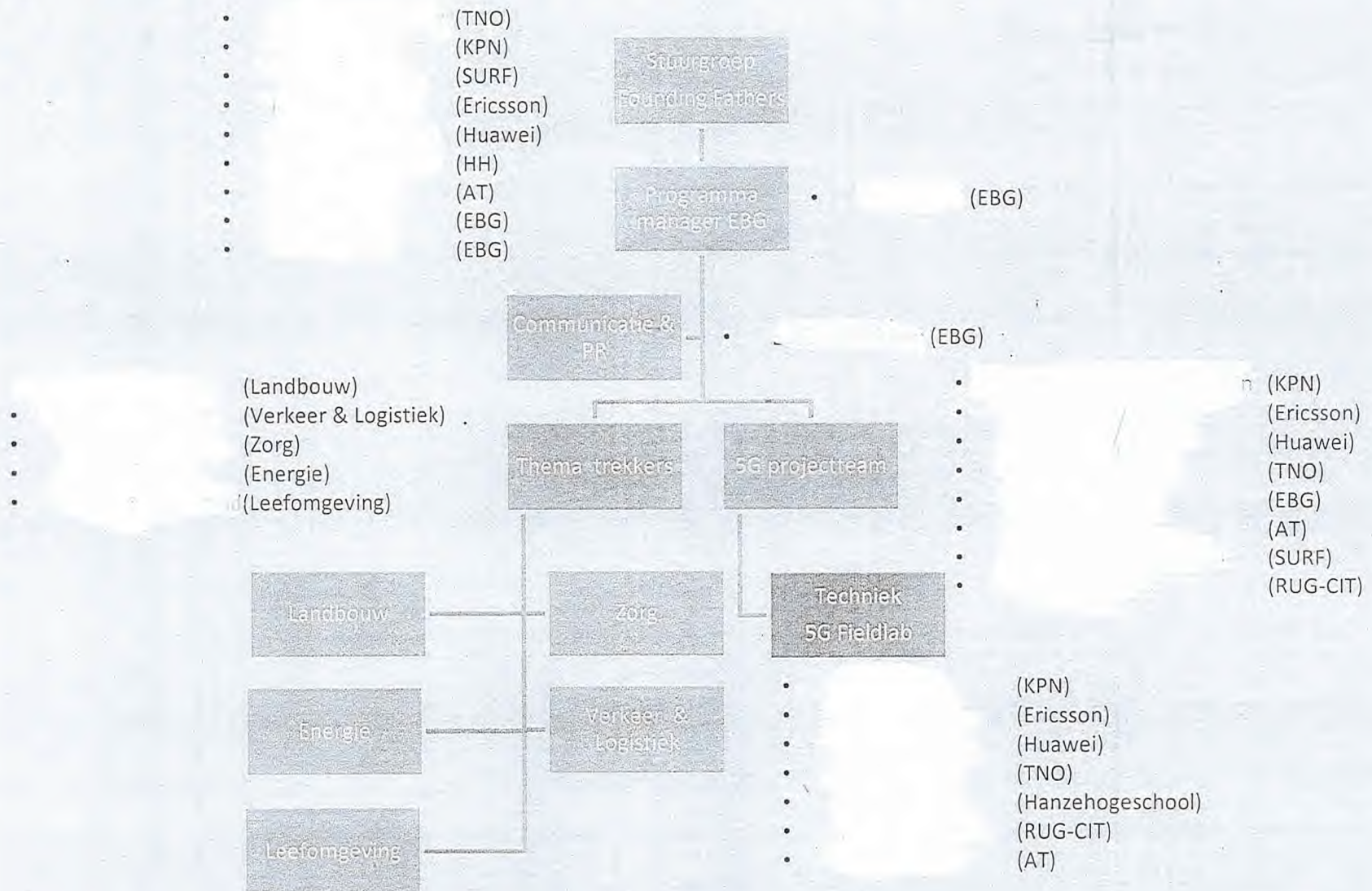
De uitgewerkte use cases worden per thema getoetst op haalbaarheid voor realisatie in de Make fase. Hiervoor worden vooraf criteria vastgesteld door het programmateam.



Programma 5Groningen - deelnemers -



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Mijlpalenplanning 5Groningen



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Mijlpaal	Datum	Toelichting
Collaboration platform 5G live	15-04-2016	Website met publiek deel en besloten deel (Intranet) tbv collaboration 5G team
Convenanten Founding Fathers getekend	01-05-2016	Vastlegging commitment
Inventory Assets 5G Fieldlab	01-06-2016	Welke assets brengen de deelnemende partijen in om 5G Fieldlab te realiseren
Use cases 5G verzameld	01-07-2016	Bruto lijst globale Use Cases uit alle thema's
Use cases voor pilots geselecteerd	01-09-2016	Netto lijst gedetailleerde Use Cases
Design en architectuur 5G fieldlab gereed	01-10-2016	Basis ontwerp 5G fieldlab gebaseerd op geplande pilots
Kenniscentrum 5G Zernike (living lab) geopend	01-10-2016	Living lab voor testen toepassingen en Proof-of-concepts
5G Paviljoen The Holland Webweek Groningen + publieksdag	30-09-2016	5G event (demo's / showcases) in gebied met dagdeel genodigden en publieksdag
Eerste pilot met (pré) 5G-toepassing in Noord-Groningen operationeel	01-12-2016	Eerste pilot in Noord-Groningen live

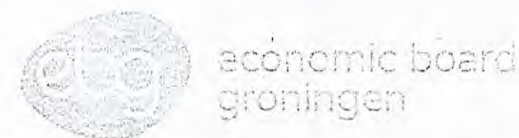
Budget fase Discover



Economic Board	ntb
Huawei	ntb
Ericsson	ntb
KPN	ntb
Agentschap Telecom/EZ	ntb
SURF	ntb
TNO	30k in kennisuren
Hanzehogeschool	In kind
TOTAAL	ntb

De bijdrage van de Founding Fathers in 2017 wordt eind 2016 vastgesteld, rekening houdend met de uitnutting van het reeds beschikbaar gestelde budget en de ontsluiting van alternatieve financieringsbronnen.

Begroting fase Discover



Projecten 2016	
Huisvesting in de regio N-Groningen	Aanname is per maand aan vaste lasten vanaf 1-3-2016 plus inrichtingskosten 1 x o eenmalig
Collaboration Platform	Website 5G met open en besloten gedeelte voor informatie, kennisdeling en collaboration (ontwikkeling + operationeel)
Community manager	Houdt de informatie op de website actueel, stimuleert gebruik, deelt kennis via social media (1 dag per week vanaf 1-3-2016)
Thema trekkers - 5 rollen	Per thema een trekker die organiseert, inspireert en output verzamelt en ontsluit (1 dag per week vanaf 1-2-2016) - 50% funding door programma
Faciliteiten living lab 5G op Zernike	Huisvesting en faciliteiten voor 5G lab voor testen en experimenten door kennisinstituten (combineren met BuildInG en/of EnTranCe)
Event juni 2016	Grootschalige bijeenkomst met presentatie use cases /showcase zelfrijdend / netwerksessie in gebied (Loppersum?)
Bijdrage Holland Webweek Groningen	5G als thema in THWWG (The Holland Webweek Groningen) 2016 op locatie in bevestigingsgebied
Diverse onkosten bijeenkomsten	Stelpost voor meetings van werkgroepen en technische team (onbenoemd maar voorzien)
Vorbereiding MAKE fase Q4-2016	Stelpost - nader in te vullen
Totaal 2016	

5Groningen – Informatie

Meeting structuur fase Discover



Founding Fathers

- 1 keer per 2 maanden
- Deelnemers: Founding Fathers
- Overall voortgang / issues / besluiten

5G Fieldlab

- 1 keer per 2 weken
- Deelnemers: 5G deskundigen techniek FF
- Ontwerp en planning realisatie 5G Fieldlab

Thema trekkers

- 1 keer per 2 weken
- Deelnemers: trekkers vijf thema's + 5G Fieldlab
- Raakvlakken en samenhang / voortgang thema's

5G Groningen – Kwaliteit



economic board
groningen

In de Discover fase richt de kwaliteitsborging zich enerzijds op het basisonwerp voor een 5G Fieldlab en anderzijds op bruikbare use cases voor toepassing in het rurale gebied. Instrumenten voor kwaliteits-bewaking zijn:

- Peer reviews van designs en use cases
- Validatie van use cases op onder meer:
 - ✓ Relevantie voor de regio
 - ✓ Technische haalbaarheid
 - ✓ Commitment partijen uit de sector
 - ✓ Potentiële levensvatbaarheid

5Groningen – Risicolijs



Omschrijving	Impact	Kans	Wijziging
Samenwerking Founding Fathers verloopt moeizaam	Hoog	25%	Rules of Engagement in convenant gebruiken en bewaken
Toepassingen op 5G komen niet van de grond	Hoog	50%	Breed draagvlak bij relevante sectoren in regio N-Groningen
Technologie 5G is onvoldoende uitontwikkeld voor fieldlab	Hoog	25%	Voorhanden zijnde 5G technologie afstemmen op use cases
Ontbreken budget voor uitwerken use cases naar pilots	Hoog	50%	Draagvlak en middelen bij bedrijven uit de sector ophalen
Beschikbare financiële resources Founding Fathers ontoereikend om voldoende vaart te maken	Hoog	50%	Aanboren subsidies landelijk en EU plus bijdragen bedrijven in kansrijke sector toepassingen
Patentrechten toepassingen zijn niet goed geborgd	Hoog	50%	Spelregels voor deelnemers in thema werkgroepen opstellen conform model EnTranCe
Er ontstaan andere 5G Fieldlab initiatieven in Nederland	Medium	50%	<ul style="list-style-type: none"> Nationaal en unieke karakter (= ruraal) 5Groningen bewaken Alle grote partijen in NL mobiliseren Voorsprong opbouwen en behouden

Backup slides: Facts & Figures 5G

- Evolution of technology generations
- Use case families



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Generation	Primary services	Key differentiator	Weakness (addressed by subsequent generation)
1G	Analogue phone calls	Mobility	Poor spectral efficiency, major security issues
2G	Digital phone calls and messaging	Secure, mass adoption	Limited data rates – difficult to support demand for internet/e-mail
3G	Phone calls, messaging, data	Better internet experience	Real performance failed to match hype, failure of WAP for internet access
3.5G	Phone calls, messaging, broadband data	Broadband internet, applications	Tied to legacy, mobile specific architecture and protocols
4G	All-IP services (including voice, messaging)	Faster broadband internet, lower latency	

Table 1: Evolution of technology generations in terms of services and performance

Source: GSMA Intelligence

Broadband access in dense areas PERVASIVE VIDEO 	Broadband access everywhere 3D+ LBS+ EVERYWHERE 	Higher user mobility HIGH SPEED TRAIN 	Machine-to-machine of things SENSOR NETWORKS
Extreme real-time communications TACTILE INTERNET 	Lifeline communications NATURAL DISASTER 	Ultra-reliable communications E-HEALTH SERVICES 	Broadband everywhere BROADCAST SERVICES

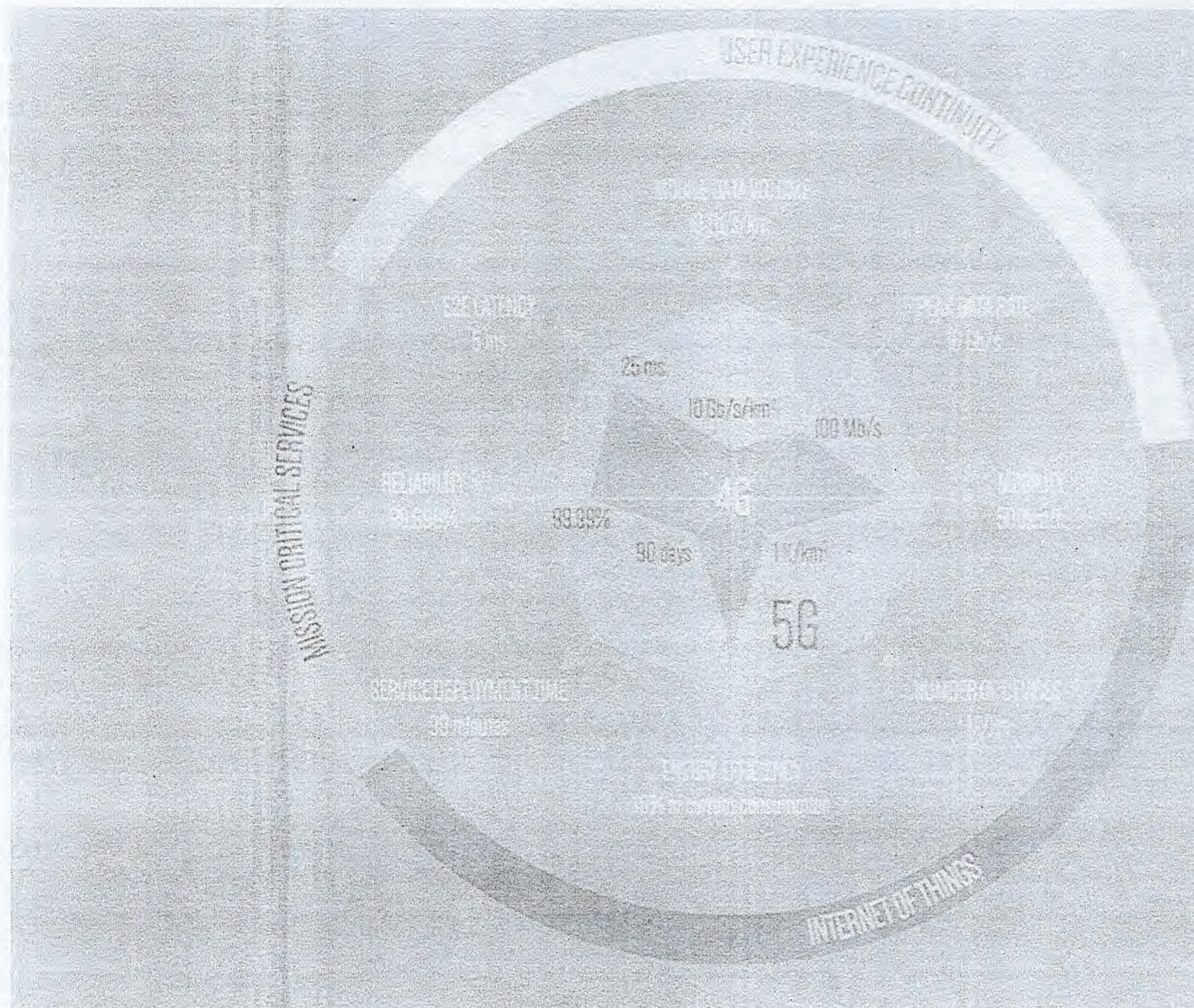


FIGURE 2. Radar diagram of 5G disruptive capabilities

[illegible]

Productie 3

Programmaplan 2018

Fase Make

Versie 0.5

15 november 2017



RONINGEN

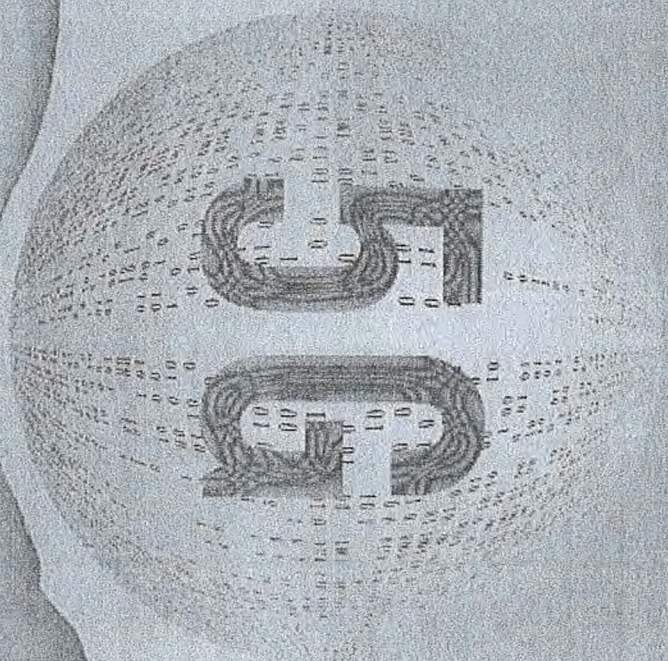
VERBONDEN MET DE TOEKOMST



snelheid 100x



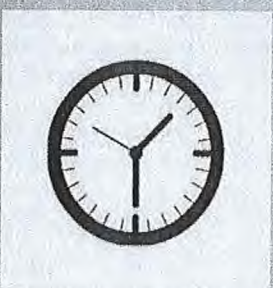
meer apparaten



beschikbaar vanaf 2020



energiezuinig



snellere reactie

Inhoudsopgave

1. Programma doelstelling
2. Fasering programma
3. Programma organisatie
4. Resultaten 2017
5. Doelstellingen 2018
6. 5Groningen – Van 5 naar 6 thema's
7. Begroting & budget
8. Risico analyse
9. Bijlagen:
 1. Overzicht Founding Fathers
 2. Fasering pilotprojecten
 3. Detailplanning





GRONINGEN

VERBONDEN MET DE TOEKOMST

24-07-2017 - v 0.1

5Groningen - Programma doelstellingen

1. Ontdekken 5G en haar toepassingen

- Uitwerken van toepassingen (use cases) die eerst getoetst en later fysiek kunnen worden getest in het 5G Fieldlab in Noord-Groningen.
- Opzetten van een permanent kenniscentrum 5G ('5G Lab' op de Zernike Campus, Groningen), waar studenten en onderzoekers van kennisinstituten, start-ups, organisaties en bedrijven praktijktesten kunnen uitvoeren met de nieuwste mobiele communicatie technieken.
- Ontwikkelen van een roadmap voor nieuwe functionaliteit in het 5G Lab
- Ontwerpen van een 5G Fieldlab waarbij maximaal wordt aangesloten bij de door internationale platforms (bijv. NGMN, 3GPP) gedragen 5G requirements
- Ontwikkeling en verspreiding van kennis over 5G en haar toepassingen, resulterend in een internationaal erkend center-of-expertise voor de mogelijkheden en toepassingen van 5G technologie in Groningen

2. Implementeren nationaal 5G Fieldlab

Op locaties in Noord-Groningen, waar (inter)nationale marktpartijen, in nauwe samenwerking met bedrijven en bewoners uit de regio, de toepassingen (use cases) kunnen testen die de beschikbaarheid van 5G vergen.

3. Aantrekken van activiteiten

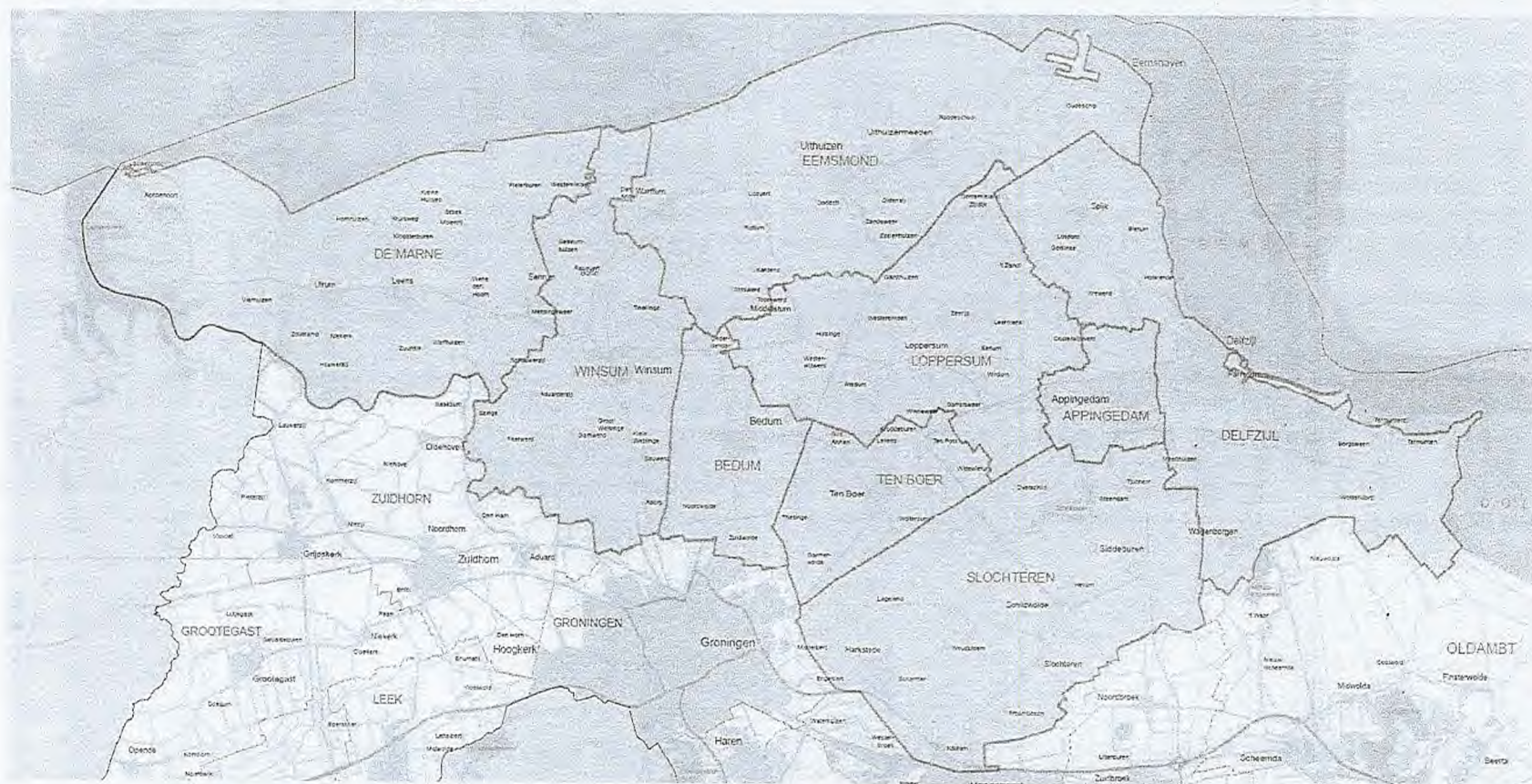
Bedrijven en organisaties komen (liefst permanent) naar het gebied vanwege de beschikbaarheid van een werkend 5G Fieldlab waar ze nieuwe toepassingen in hun sector kunnen uitproberen. Doel is blijvende werkgelegenheid en verbetering leefbaarheid in de regio.

5G Fieldlab in Noord-Groningen

Het aardbevingsgebied



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Discover

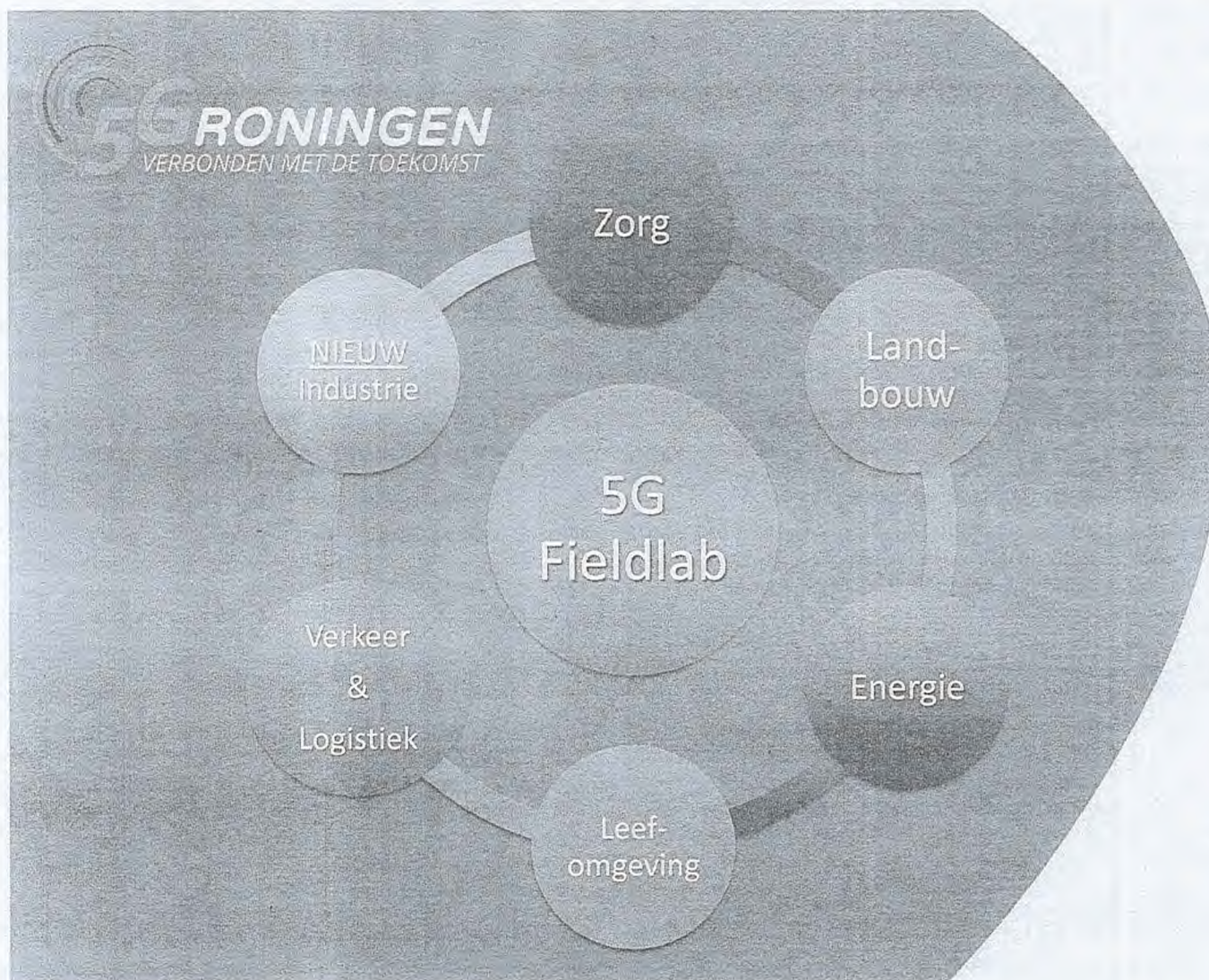
2016-2017

Make

2017-2019

Use

2018-2020

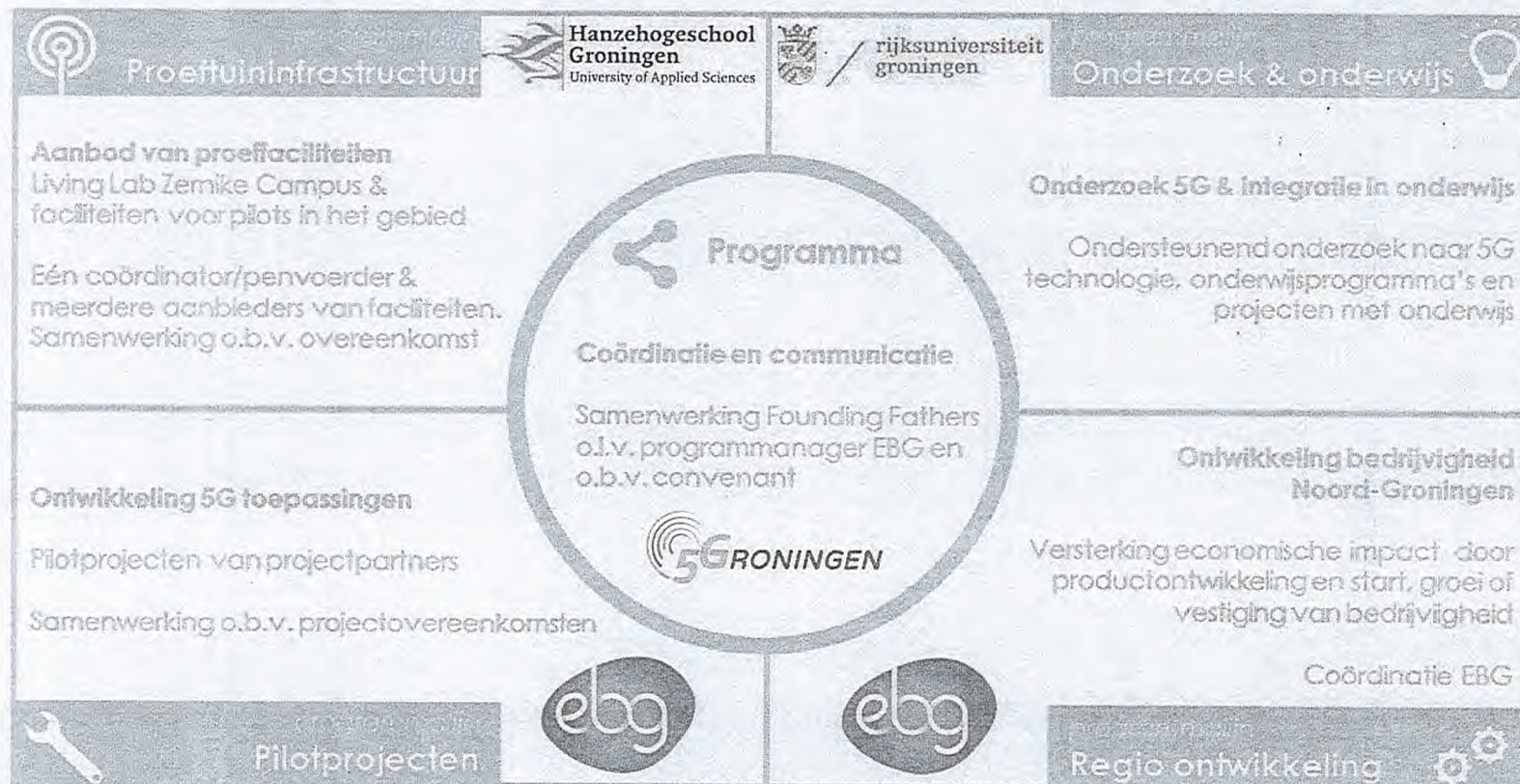


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Van 5 naar 6 thema's

In 2017 tekent zich
een nieuw thema af:
industrie

- Agrochemie in Delfzijl en energie in Eemshaven
- Sinds december 2016 status Smart Industry Fieldlab



Programma 5Groningen heeft als basis Convenant 5Groningen met 10 Founding Fathers.
Het programma heeft 4 programmaliijnen:



1. Proeftuin infrastructuur

- Hanzehogeschool is leading (tevens penvoerder EFRO)
- Basis: Samenwerkingsovereenkomsten tussen partijen



2. Pilotprojecten

- Marktpartij in sector is leading
- Basis: Projectovereenkomst (met juridische clausules uit convenant)
- EBG faciliteert financieel met subsidieregeling voor MKB



3. Onderzoek & Onderwijs

- RUG is leading en richt een leerstoel 5G op met support Agentschap Telecom
- Digital Society Hub Hanzehogeschool – 5G als bouwsteen innovatiewerkplaats
- Smart Campus initiatief SURF

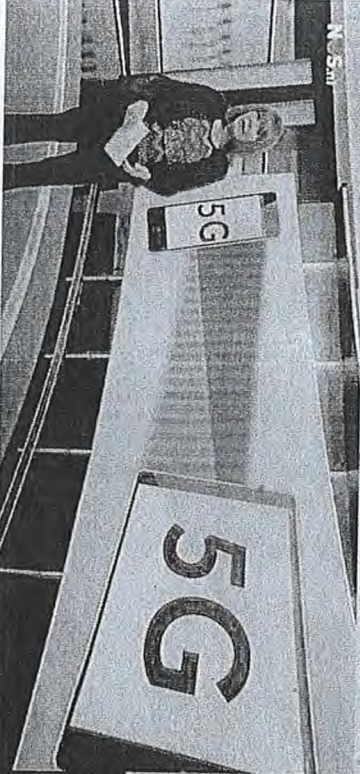


4. Regio ontwikkeling

- EBG is leading en bewaakt samenhang met eigen missie en andere programma's

Mijlpalen 2017

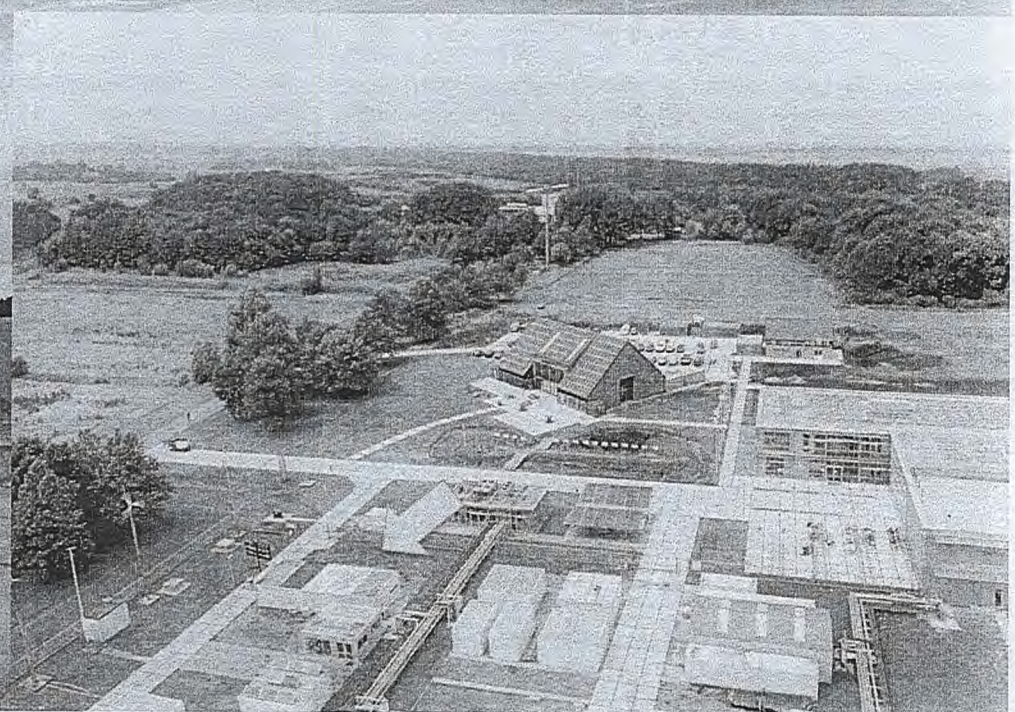
Mijlpaal	Kwadrant	Datum	Toelichting
Pilotregeling 5Groningen geopend		✓ 01-05-2017	Speciaal voor (mkb-)bedrijven uit Noord-Nederland heeft EBG subsidieregeling voor 5G projecten geopend
Kenniscentrum 5G Zernike campus (5G lab) geopend		✓ 01-06-2017	Living lab voor testen toepassingen / Proof-of-concepts
Eerste pilot met (pré) 5G-toepassing in Noord-Groningen operationeel		✓ 01-03-2017	Eerste pilot in Noord-Groningen live Smart potato sensoren in gebruik genomen
Call Proeftuin SNN voor Living Lab en 5G Fieldlab succesvol		✓ 15-09-2017	€2,5 mln subsidie voor 5G Lab en 5G Fieldlab uit EFRO / provincie Groningen via SNN gehonoreerd
5 pilots zijn actief en in de fase Proof-of-Concept of uitvoering		✓ 01-06-2017	Elk pilotproject wordt volgens een vaste fasering uitgevoerd.
10 nieuwe use cases ontvangen en geclassificeerd		✓ 01-09-2017	Instroom nieuwe use cases uit alle sectoren
Trendship Groningen – EBG Pitch 5G editie		✓ 12-11-2017	Deelname Trendship event om 5G pilots te presenteren en nieuwe use cases op te halen
15 nieuwe use cases ontvangen en geclassificeerd		01-12-2017	Instroom nieuwe use cases uit alle sectoren
<ul style="list-style-type: none"> • 10 pilots actief - 5 Proof-of-Concept gereed • Verlenging Convenant 5Groningen 2018-2020 		15-12-2017	<ul style="list-style-type: none"> • Pilots in verschillende sectoren actief • Convenant voor de periode 2018-2020








Jan : Eerste sensoren smart potato geplaatst in Zevenhuizen
Feb : Werkbezoek minister Kamp aan 5G Lab in opbouw
Mrt : Pitch 5G Smart Mobility voor minister Schultz van Haegen en CdK provincie Groningen
Apr : Pilotregeling 5G van EBG geopend voor co-financiering pilotprojecten in proeftuin
Mei : Kickoff zelfrijdende OV-bus met provincie en aantal gemeenten Groningen
Mei : Geslaagde test met camerabril op ambulance met brandwondencentrum Martiniziekenhuis
Jun : Opening 5G Lab op Zernike Campus – veel aandacht landelijke pers (Volkskrant, NOS Radio)
Jul : EFRO aanvraag ingediend voor 2,5 mln co-financiering – besluit aangehouden tot september
Jul : Succesvolle test met 360 graden camera op surveillance voertuig politie
Sep : Toekenning EFRO-subsidie aan 5G proeftuin
Okt : EBG pitch – de 5G editie (in combinatie met Trendship)

- Pilots gestart met landbouw (drones en smart potato), vervoer (zelfrijdende bus), energie (Energy4All), leefomgeving (trillingssensoren) en zorg (virtuele arts in ambulance)
- Aantal ambitieuze use cases verzameld met hoge 5G uitdaging (o.m. grondradar Gasunie in combinatie AR)

5G LAB



Doelstelling	Toelichting	Kwadrant	KPI
12 pilots live brengen	In de loop van het jaar steeds nieuwe pilots opstarten op basis van de gerankte use cases. Diversiteit over de sectoren is hierbij essentieel.	Ontwikkeling 5G toepassingen	# Live gebrachte pilots
3-4 testlocaties 5G fieldlab in Noord-Groningen (tijdelijk of permanent) (gedreven door de behoefte in de pilots en na goedkeuring stuurgroep Founding Fathers)	Voorbeelden van mogelijke testlocaties: <ul style="list-style-type: none"> • In de havens van Groningen Seaports voor Smart Industry en logistiek; • Testlocatie voor onderwijs & onderzoek op de Zernike Campus • Testlocatie voor akkerbouw en veehouderij; • Testlocatie voor zorgpilots; • Testlocatie voor energie; • Testlocatie voor leefomgeving om pilots met waterbeheer, toerisme en aardbevingssensoren 	 Proeftuin Infrastructuur	# Testlocaties ingericht
6 pilots hebben de mijlpaal <i>Proof-of-Concept</i> afgerond bereikt	Elk pilotproject wordt volgens een vaste projectfasering uitgevoerd (voor details zie Bijlage): <ol style="list-style-type: none"> 1. Proof of Principle (PoP) 2. Proof of Concept (PoC) 3. Uitvoering pilot in 5G Fieldlab 	Ontwikkeling 5G toepassingen	# pilots die fase PoC hebben afgerond

Doelstelling	Toelichting	Kwadrant	KPI
Roadmap 5G Proeftuin	Voor (potentiële) gebruikers van de 5G Proeftuin is er een actuele roadmap met de huidige mogelijkheden van 5G plus een outlook naar de capabilities voor de komende 12 maanden (rolling forecast).	 Proeftuin Infrastructuur	Dynamische roadmap (menukaart) met capabilities in de 5G Proeftuin in de tijd geplot
Deel 2 co-financiering 5G Fieldlab geregeld	Om het tempo en de slagkracht van dit unieke 5Groningen initiatief te vergroten wordt een co-financiering van 10 miljoen euro aangevraagd uit (bij voorkeur) nationale fondsen, met de horizon van het programma tot 2020.	 Onderzoek & Onderwijs	In 2018 komt opnieuw €2,5 mln aan co-financiering beschikbaar uit landelijke fondsen
15 nieuwe use cases toegevoegd	De stroom use cases zal op gang blijven, en er worden minimaal 15 nieuwe use cases verwacht die potentieel nieuwe pilots gaan opleveren.	 Regio ontwikkeling	# Nieuwe use cases
20 studenten van HG en RUG nemen deel aan pilotprojecten	Voor de uitbouw van de programmaliijn onderzoek en onderwijs is het van groot belang om studenten van RUG en Hanzehogeschool te laten deelnemen in de innovatieve pilotprojecten met 5G, bij voorkeur als onderdeel van een onderwijs- of afstudeeropdracht. RUG en Hanze moeten hierin het voortouw nemen.	 Onderzoek & Onderwijs	# studenten dat deelneemt in pilotprojecten

Mijlpalenplanning 2018

Mijlpaal	Datum	Toelichting
Roadmap 5G proeftuin gereed	01-02-2018	Roadmap met 12 maanden rolling forecast en menukaart met capabilities 5G proeftuin
5 pilots zijn actief en in de fase Proof-of-Concept of uitvoering	01-06-2018	Elk pilotproject wordt volgens een vaste fasering uitgevoerd (zie Bijlage 2)
Opbouw 5G proeftuin op 3 testlocaties gereed	01-06-2018	
10 nieuwe use cases ontvangen en geclassificeerd	01-09-2018	Instroom nieuwe use cases uit alle sectoren
Let's Gro 5Groningen / Trendship	12-11-2018	Deelname Let's Gro / Trendship event om 5G pilot resultaten te presenteren aan publiek
Toezegging aanvullende co-financiering uit landelijke fondsen naast EFRO	01-11-2018	Uitkomst van lobby overleg bij Ministerie van EZ
15 nieuwe use cases ontvangen en geclassificeerd	01-12-2018	Instroom nieuwe use cases uit alle sectoren
12 pilots actief waarvan 6 pilots de fase Proof-of-Concept hebben afgerond	15-12-2018	Pilots in verschillende sectoren actief en in uitvoering

De eerste pilots zijn gestart in 2017



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Smart Potato is een landbouwtoepassing waarbij met een 'sensor-aardappel' real-time data wordt verwerkt voor optimalisatie van het teeltproces.

Drones die de akkerbouw gewassen in kaart brengen en realtime doorgeven



Intelligentie in het regionale energienetwerk is een energie-toepassing waarbij real-time data verzameld wordt over en voor het energienetwerk.



5G golf door het landschap is een leefomgeving-toepassing waarbij continu gemonitord wordt wanneer een beving plaatsvindt en hoe deze verloopt.



Specialistische zorg-indicatie is een zorg-toepassing waarbij een medisch specialist op afstand kan bepalen welke zorg nodig is.



Autonoom WMO-vervoer is een verkeer/logistiek-toepassing waarbij met een zelfrijdende bus WMO-vervoer uitgevoerd wordt.

Founding Fathers stuurgroep

- 1 keer per 2 maanden
- Deelnemers: Founding Fathers
- Overall voortgang / issues / besluiten

5G Fieldlab projectteam

- 1 keer per 4 weken
- Deelnemers: 5G experts en thematrekkers
- Planning en realisatie 5G Fieldlab met pilots

Pilotprojecten

- 1 keer per n weken (afhankelijk van pilot)
- Deelnemers: 5G experts, sectordeelnemers
- Voortgang en deliverables pilotprojecten

Begroting fase Make 2018

Onderdeel	Activiteit	Bedrag
Exploitatie Collaboration Platform	Website 5G met open en besloten gedeelte voor informatie, kennisdeling en collaboration (operationeel)	€ 5.000
Pilotregeling 5G	Het opstarten van pilots, waarbij voor elke pilot EBG onder voorwaarden maximaal €50K beschikbaar stelt als startkapitaal voor de opstart – uitoefening door SNN	€ 500.000
Communicatie	Actueel houden informatie op de website, stimuleren gebruik, delen van kennis via social media, aankondiging events etc.	€ 50.000
Inrichting 5G Living lab Zernike	Betreft de kosten voor het inrichten en aankleden van het Living Lab 5G op de Zernike campus.	€ 20.000
Event 5Groningen in LetsGro	In najaar 2018 een LetsGro event met eerste pilotresultaten	€ 45.000
Diverse onkosten bijeenkomsten	Stelpost voor meetings van werkgroepen en technische team	€ 5.000
Onbenoemd maar voorzien	Te verwachten kosten voor juridische ondersteuning en het opstellen van subsidie aanvragen	€ 50.000
Totaal 2018		€ 1.075.000

Budget fase Make 2018

Partner	Cash *	In kind
Economic Board		Nee
Huawei	-	Ja
Ericsson	-	Ja
KPN	-	Ja
Vodafone	-	Ja
Agentschap Telecom/EZ	-	Ja
SURF	-	Ja
TNO	-	Ja
Hanzehogeschool	-	Ja
RUG	-	Ja
TOTAAL		

* Vanaf 2018 is de cashbijdrage van €30k van een zestal Founding Fathers vervangen door een bijdrage 'in kind' aan de 5G Proeftuin

Risicoanalyse (1)

Omschrijving	Impact	Kans	Beheersmaatregel
Samenwerking Founding Fathers verloopt moeizaam	Hoog	25%	<ul style="list-style-type: none"> • Vernieuwen convenant 2018-2020 • Rules of Engagement in convenant gebruiken en bewaken
Beschikbare financiële resources Founding Fathers ontoereikend om voldoende vaart te maken	Hoog	50%	Aanboren subsidies landelijk bij EZ en EU (EFRO) – najaar 2017 uitsluitel EFRO
Samenstellen projectteam voor pilot met juiste kwaliteit en mix (samenstelling rollen en disciplines) lukt onvoldoende	Hoog	75%	<ul style="list-style-type: none"> • Actief het netwerk van EBG, Founding Fathers en alle partners inzetten • Projecteigenaarschap nog sterker benadrukken • Capabele projectleiders selecteren

Omschrijving	Impact	Kans	Beheersmaatregel
USP's (Unique selling points) van programma 5Groningen worden onvoldoende onderkend en gewaardeerd waardoor aanlevering use cases en pilots uit MKB stagneert	Hoog	50%	<ul style="list-style-type: none"> • Robuust communicatieplan en uitvoering publicitaire acties • Menukaart 5G Proeftuin realiseren
Het 5G-gehalte van living lab en field labs is onvoldoende uitdagend om 5Groningen onderscheidend te maken	Hoog	50%	<ul style="list-style-type: none"> • Founding Fathers uit telecom-sector uitdagen om actuele en relevante 5G technologie beschikbaar te stellen • Co-financiering EZ aanvragen
Aantal partners in 5Groningen is te groot om programma nog effectief te besturen - bij toetreding nieuwe partners is dit een serieuze bedreiging	Hoog	50%	Programmabesturing en governance 5Groningen regelmatig ijk en zonodig herzien
Uitvoering 5G subsidieregeling van EBG door SNN remt start en voortgang pilotprojecten	Hoog	50%	<ul style="list-style-type: none"> • Werkafspraken SNN monitoren en bijstellen • Reguliere evaluatie proces voor subsidie-aanvragen (ongoing)

Bijlage 1: Founding Fathers 5Groningen



Bijlage 2: Innovatieproces pilots



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