

Research Collaboration Agreement
between
University of Chile,
National Astronomical Observatory of Japan
and
Nippon Telegraph and Telephone Corporation

This Research Collaboration Agreement (hereinafter referred to as "Agreement") is made by University of Chile, located at Avda Liberador Bernardo O'Higgins No 1058, Santiago, Chile (hereinafter referred to as "UCH" or "Party"), National Astronomical Observatory of Japan, located at 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan (hereinafter referred to as "NAOJ" or "Party") and Nippon Telegraph and Telephone Corporation, located at 3-1 Ootemachi 2-chome, Chiyoda-ku, Tokyo 100-8116, Japan (hereinafter referred as "NTT" or "Party"), to conduct a research collaboration on remote astronomical observation using global digital networks.

WHEREAS

NTT agrees to give authority to use results of research and development activity, including that from this research collaboration activities, to the operation companies of Nippon Telegraph and Telephone East Corporation, Nippon Telegraph and Telephone West Corporation, NTT Communications Corporation, NTT Data Corporation and NTT Mobile Communications Network Incorporated and its subsidiaries (hereinafter referred to as "Operation Company").

Now THEREFORE, UCH, NAOJ and NTT hereby agree with respect to smooth furtherance of the research collaboration activities, treatment of patents and information related to the research collaboration and use of the results of the research collaboration as follows:

Article 1 Purpose and Scope of the Research Collaboration

1.1 The purpose of the Research Collaboration to be performed under this Agreement shall be to conduct the research activities on remote observation of astronomy using a global digital network. This network consists of GEMnet between Japan and the United States of America, the Internet 2 between the United States of America and Chile and the digital network which is provided by the AccessNova program of UCH.

1.2 The scope of research activity by each Party is prescribed as follows.

- (1) UCH conducts the research of application of network to astronomy, as a part of multifaceted utilization of network.
- (2) NAOJ conducts the basic research of radio astronomy, utilizing remote astronomical observation.
- (3) NTT conducts the research of telecommunication technology and data processing technology in radio astronomy.

Article 2 Results of the Research Collaboration and Publication thereof

2.1 Each Party shall make effort to make public the results of the research collaboration, in consideration that the main purpose of the collaboration is to conduct the basic academic research of astronomy.

2.2 Any information generated from the Research Collaboration which is useful for the resolution of certain research problems covered by the scope of the Research Collaboration described in Article 1.2 shall be considered as results of the Research Collaboration and said results shall be mutually disclosed in writing and confirmed by the parties hereto. Parties shall determine collectively which information should be treated as confidential, and which information can be published respectively upon consultation between the parties.

2.3 From time to time during the term of the Research Collaboration, either Party may officially publish information regarding the results of the Research Collaboration and the matters regarding this Agreement upon obtaining the consent of the other Parties.

Article 3 Performance of the Research Collaboration Activities

3.1 Each of the Parties shall carry out the Research Collaboration to the best of its technical knowledge and ability on each phase of the Research Collaboration.

3.2 The Research Collaboration shall be carried out through mutual exchange of information respectively owned by UCH, NAOJ and NTT in each phase of the Research Collaboration, within the scope necessary to conduct the Research Collaboration, relating to the subject matter of the Research Collaboration on which no confidentiality obligation is imposed by third parties.

3.3 During the term of the Research Collaboration, the Parties hereto shall hold meetings periodically to report to each other and exchange information on the state of progress and the results of the Research Collaboration and related matters and to discuss any technical problems encountered. Details of the meetings, such as the place, time, frequency and duration, shall be determined by consultation between the Parties hereto.

Article 4 Expenses and Provision of Equipment

4.1 Each of the Parties hereto shall bear the corresponding expenses incurred by it in carrying out the Research Collaboration; provided, however, that expenses incurred in work jointly carried out by the Parties shall be negotiated separately.

4.2 UCH provides the equipment in UCH, which is necessary for NAOJ to transmit data between the equipment of NAOJ in Chile and that in Japan, and the equipment to connect to the Chilean academic network. NAOJ provides the equipment to transmit data between UCH and the antenna site and the equipment in its Mitaka Campus. NTT provides the network equipment between NAOJ and the United States of America.

Article 5 Patent Application

5.1 Invention solely made by a party shall be treated as follows. During the course of the Research Collaboration, a Party hereto may file a patent application (including application for a utility model and a design) solely in its own name for any invention (including creation of design and utility model), improvement reasonably considered to be patentable, including application for a utility model and design, (hereinafter called "Invention") independently made by employee(s) of that Party

(without use of information disclosed by the other Party) in connection with the Research Collaboration. In this case, the filing Party shall inform the other Parties in confidence in writing of the number and date of the application, the title of the Invention and the name of the inventor with a copy of the patent specification filed within sixty (60) days from the filing date.

5.2 Joint Invention shall be treated as follows. In case of an Invention jointly made by employee(s) of the Parties hereto during the course of the Research Collaboration or of an Invention solely made by employees(s) of a Party hereto based on technical information disclosed hereunder by the other Party, all of the rights to the Invention and patents (here and hereafter including rights of utility model and design) granted thereon shall be jointly owned by the Parties. Details of filing and prosecuting such patent application shall be determined upon consultation between the Parties hereto.

Article 6 Working of the Patents

6.1 Patents solely owned by a Party shall be treated as follows. The Parties hereto shall each grant a license to the other Party and to Operation Companies, if requested, on non-exclusive basis to work the patent (including patent pending) acquired by it pursuant to the provision of Article 5.1 and the conditions for such license shall be determined by consultation among the parties concerned.

6.2 Patents jointly owned by the Parties shall be treated as follows. In case where a Party hereto intends to grant a license to a third party, except for Operation Company, to work the jointly owned patent (including patent pending) set forth in Article 5, or otherwise dispose (abandon or assign) its interest in the jointly owned patent, said Party shall obtain the prior consent of the other Parties. Provided, however, that either Party has a third party make use of the jointly owned patent for its products and/or development of services and for its own business unrestrictedly and without payment to the other Parties. Furthermore, Parties hereto agree that Operation Companies may work the jointly owned patent for its products and/or development of services, and for its own business (including but not limited to the case where Operation Companies has a third party make use of the jointly owned patent for its products and/or development of services and for its own business) unrestrictedly and without payment to either Party.

6.3 Background Patent solely owned by a Party shall be treated as follows. This Agreement or provision of information hereunder by either Party to the other Parties

shall not constitute a grant of license, whether expressed or implied, to the other Parties or Operation Companies with respect to the patent or patent application owned or prosecuted by the disclosing Party hereto as of the effective date of this Agreement or the patent application filed by either Party independently of the Research Collaboration after the effective date of this Agreement. Any license to work such Background Patent and the conditions therefore shall be determined upon consultation between the parties concerned.

Article 7 Treatment of Information

7.1 Disclosure of any information by one Party to the other Parties related to the Research Collaboration shall be made by the project Manager of the disclosing Party or a person under his or her control to the Project Manager of the receiving Party or a person under his control.

7.2 Disclosure or exchange of any information made hereunder by one Party to the other Parties or Operation Companies shall not constitute any representation, guarantee, confirmation or undertaking regarding infringement of a patent right or other proprietary right owned by a third party.

Article 8 Non-disclosure of Confidential Information

8.1 Any information deemed by a Party hereto to be confidential and disclosed hereunder in writing to the other Party shall be appropriately labelled as "UCH Confidential" or "NAOJ Confidential" or "NTT Confidential", as the case may be. Any confidential information disclosed hereunder orally or visually shall be confirmed by reducing the same, without omission, to written form, by the Party disclosing the same within thirty (30) days from the date of the disclosure. Such written information shall be appropriately labelled as "UCH Confidential" or "NAOJ Confidential" or "NTT Confidential", as the case may be. Any doubts as to whether the disclosed information qualifies as being confidential shall be determined by consultation in good faith between the Parties hereto.

8.2 Any new technology jointly acquired during the course of the Research Collaboration by the Parties shall, upon jointly confirming by the Parties that such information is novel and should be kept in confidence, be labeled with an appropriate indication by, for example, affixing the word "Joint UCH/NAOJ Confidential" on the

document wherein such information is described.

Article 9 Confidentiality Obligation

Each of the Parties hereto shall keep any confidential information solely owned by the other Party as set forth in Article 8.1 and any confidential information jointly owned by the Parties as set forth in Article 8.2 in confidence and shall not disclose, publish or leak information solely owned by the other Parties for a period of 5 years from the date of the disclosure, unless otherwise agreed upon by the Parties hereto. UCH may disseminate any confidential information received from NAOJ or NTT, NAOJ may disseminate any confidential information received from UCH or NTT and NTT may disseminate any confidential information received from UCH or NAOJ, respectively in its own organization exclusively on a need-to-know basis for the purpose of this Agreement. Parties shall not disseminate to the persons other than those having "need-to-know".

Article 10 Exception to Confidentiality Obligation

Notwithstanding the other provisions contained herein, the obligations stipulated in any of the provisions above shall not apply to the following information:

- (1) Information already owned by the recipient Party at the time of disclosure without confidentiality obligation to the disclosing Party;
- (2) Information developed by the recipient Party independently of the Research Collaboration without using the proprietary information disclosed by other Party hereto;
- (3) Information which is in the public domain or which hereafter becomes part of the public domain through no fault of the Party concerned ;
- (4) Information duly received by the recipient Party from a third party; or
- (5) Information, disclosure of which to a third party is approved in advance by the disclosing Party in writing.

Article 11 Making Use of Confidential Information

11.1 The recipient party to whom the confidential information was disclosed by the disclosing party under Article 8.1 may freely make use of the disclosed information, including reports and documentary materials prepared by the recipient party and

containing the disclosed information, and the idea, concept or technology contained in such disclosed information for its products and/or development of services, and for its own business subject to the confidentiality obligation of Article 8.3. UCH and NAOJ agree that Operation Company may freely make use of the disclosed information same as NTT, subject to confidential obligation imposed on Operation Company pursuant to Article 8.3. Provided, however, that in case where the disclosed information was independently developed from the Research Collaboration, and the disclosing party expressly states at the time of disclosure thereof that prior consent of the disclosing party is needed for making use of the same by the recipient party, the parties hereto shall separately negotiate as to how the Designated Confidential Information is to be treated.

11.2 Any Party hereto may freely make use of the jointly owned confidential information set forth in Article 8.2 for its own business. Parties hereto agree that Operation Companies may make use free of the jointly owned confidential information set forth in Article 8.2 for Operation Companies' own business.

11.3 Each of the parties hereto may enter into an agreement with a third party for having that third party made the products for its own use, developed during the course of the Research Collaboration and may thereby disclose to that third party confidential information set forth in Articles 8.1 and 8.2, subject to Article 11.4. Each party hereto agrees that Operation Company may enter into an agreement with a third party for having that third party make the products for Operation Company's own use, during the course of the Research Collaboration and may thereby disclose to that third party confidential information set forth in Articles 8.1 and 8.2, subject to Article 11.4.

11.4 Any party, including Operation Company, hereto may disclose confidential information to a third party when such party have that third party make products by operation of the provisions of Article 11.3 notwithstanding the confidentiality obligation provided in Article 8.3, subject to obtaining a written commitment by that third party stating that it shall observe the same confidentiality obligation as imposed on the party hereto concerned.

11.5 Notwithstanding anything contained in this Article 11 to the contrary, the provisions of Article 12 shall solely apply to the use and license of any copyrighted work even if such copyrighted work also falls within the definition of "confidential information."

Article 12 Rights to Copyrighted Works

12.1 Among the results of the research collaboration, the works created jointly by the Parties shall be jointly owned by the Parties. The Parties may jointly protect such works by obtaining and maintaining copyright or by registration or any other protective measures.

12.2 Either Party hereto may use, or have any third party use for UCH's or NAOJ's or NTT's products and/or development of services, and for own business purpose, the works jointly created by the Parties in any form without compensation to the other Parties. Parties agree that Operation Companies may use, or have any third party use for own business purpose, the works jointly created by the Parties in any form without compensation to either Party hereto.

12.3 In the event either Party will have a third party use the works jointly created by the Parties for any purpose other than related Party's own business purpose, such Party shall obtain the other Parties' prior consent.

12.4 Among the results of the research collaboration, the works created independently by UCH's employees or NAOJ's employees or NTT's employees shall exclusively belong to the Party whose employees have created such works. Either Party shall grant to the other Party an unwarranted, irrevocable, non-exclusive non-transferable license to use such works to the extent such license is necessary to use the results of the Research Collaboration, and the Parties shall separately agree upon in writing the terms and conditions of such grant of license after mutual consultation. Furthermore, UCH and NAOJ agree to grant to Operation Companies an unwarranted, irrevocable, non-exclusive non-transferable license to use such works to the extent such license is necessary to use the results of the Research Collaboration, and UCH, NAOJ and Operation Companies shall separately agree upon in writing the terms and conditions of such grant of license after mutual consultation.

12.5 If it is imperative for either Party to use any of the existing works of the other Parties, copyrights of which is owned by the other Parties, in order to use or have any third party use the works set forth in the preceding subsections for such Party's own business purpose, then, after such imperative is justified the Party who owns such existing works shall grant to the other Parties a license to use said works, and the Parties shall separately agree upon in writing the terms and conditions of such grant of license after mutual consultation. If it is imperative for Operation Companies to use any of the existing works of other Parties, copyrights of which is owned by other Parties, in order to use or have any third party use the works set forth in the preceding subsections

for Operation Companies' own business purpose, then, other Parties who own such existing works shall grant to Operation Companies a license to use said works, and the other Parties and Operation Companies shall separately agree upon in writing the terms and conditions of such grant of license after mutual consultation.

Article 13 Project Manager

13.1 Each of the Parties hereto shall staff a Project Manager who shall be responsible for the coordination of the Research Collaboration of the Party concerned as follows:

UCH: Mr. Eduardo Vera, Professor and Director, AccessNova Program
NAOJ: Mr. Masato Ishiguro, Professor and ALMA-J Project Director
NTT: Mr. Hisao Uose, Director, R&D Globalization Strategy Planning,

13.2 Either Party hereto may, at any time during the term of this Agreement, change its appointed Project Manager by notifying the other Parties at the address previously designated.

Article 14 Term and Termination

This term of this research collaboration shall be from January 15, 2003 to March 31, 2004 ; provided, however, that either of the Parties hereto may terminate the research collaboration or extend the term of the research collaboration, upon consultation by each Parties, if unavoidable circumstances such as natural disasters preventing the Parties from continuing the research collaboration should occur. Upon expiration or earlier termination of this Agreement (hereinafter called the "termination hereof"), all rights, privileges and obligations hereunder shall cease, except for the following provisions:

- (1) Provisions of Articles 2 and 5.1 hereof shall continue in effect for 5 years from the termination hereof.
- (2) Provisions of Articles 5 and 6 hereof shall continue in effect during a period of prosecution of patent application for the Invention acquired in connection with the Research Collaboration or the life of the patent granted thereon after the termination hereof.
- (3) Provisions of Articles 8 and 9 hereof shall continue in effect as long as the period set forth in the first sentence of Article 8.3 after the termination hereof.
- (4) Provisions of Articles 10, 13 and 14 shall continue in effect after the termination hereof.

Article 15 Export

15.1 No information received by the recipient Party or created in connection with the Research Collaboration, whether or not subject to confidentiality obligation under this Agreement, or any portion thereof shall be exported or re-exported to any country, except in accordance with applicable export control laws and regulations. If requested the Parties agree to sign written assurances and other export-related documents to certify compliance with such export laws and regulations.

15.2 If in case of Article 15.1 above, recipient Party is Operation Companies, NTT shall have such Operation Companies perform the obligation set forth in Article 15.1 above.

Article 16 Network

The NTT's network used in this research collaboration, which is called "GEMnet," is the network for experimental use. This network is used for a number of experimental projects conducted by NTT Laboratories. Due to the nature of this network, the bandwidth assignment of the network is subject to coordination by each Party. NTT shall not be liable for any loss that may be caused by any problems in the network. Similarly, UCH shall not be liable for any loss that may be caused by any problems in the network between UCH and San Jose.

Article 17 Settlement of Dispute

17.1 In the event of any difference or dispute which may arise between the parties in connection with this Agreement or its provisions, the Parties shall settle such dispute by mutual consultation in good faith and in accordance with the principle of mutual trust.

17.2 Any and all disputes arising out of or in connection with this Agreement or the subject thereof shall be settled by arbitration composed of 3 arbitrators.

- (1) The arbitration is held in Santiago in accordance with the rules of the Chilean Commercial Arbitration Association if it is commenced against UCH.
- (2) The arbitration is held in Tokyo if it is commenced against NAOJ or NTT. The arbitration shall be conducted in accordance with Japan Commercial Arbitration Association if arbitration is commenced by UCH against NTT.

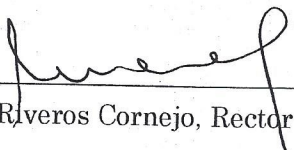
Each party shall be finally bound by the arbitral award. The cost of the arbitrators and

administration of the arbitration shall be borne in accordance with the directive of the arbitral award.

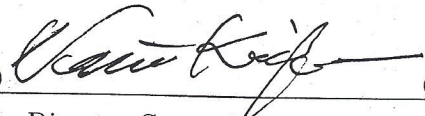
17.3 This Agreement will be governed by and construed in accordance with the laws of Chile if arbitration is held in Santiago and the laws of Japan if arbitration is held in Tokyo.

IN WITNESS WHEREOF, this Agreement is prepared in duplicate and each Party hereto shall affix its name and seal hereto and retain one copy hereof.

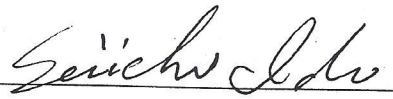
For the University of Chile (UCH)

(signature)  (date) 15/1/2003
Luis Alfredo Riveros Cornejo, Rector

For National Astronomical Observatory of Japan (NAOJ)

(signature)  (date) 15/07/2003
Norio Kaifu, Director General

For Nippon Telegraph and Telephone Corporation (NTT)

(signature)  (date) 1/15/2003
Seiichi Ido, Executive Director, Information Sharing Laboratories Group