

TOWARD THE EAST ASIAN OBSERVATORY

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ABSTRACT

I report here about the future direction of cooperation of astronomy in East Asia region, which has been a long-years subject of the EAMA since 1990. During this EAMA-6 we had many positive discussions and remarkable progress toward the promotion of our cooperation. We also had an “East Asian Observatory” WG meeting yesterday with many attendants, and actively discussed this important subject in some detail. The following report is to summarize the fruitful products we had in the EAMA-6 discussions and in past EAMA activities, and to propose a direction and some action items toward the bright future of astronomy in East Asia.

Key words : astronomy — international cooperation — East Asian Observatory

I. WHAT IS THE “EAST ASIAN OBSERVATORY” ?

What do we aim through the EAMA activities?

An observatory with good telescope on good site as we had intensively discussed recent years should be an important target, but what is the target we finally need? This question was made fairly clear through the EAMA-6 discussion. It is an East Asian astronomical organization to carry out cutting edge astronomy through the joint developments, constructions and operation of various world-level observing facilities. It should act as a third party together with (North) American Continent and European Union, i.e. ESO. Such organization in future might be called as “East Asian Observatory (EAO)”.

We realize that the EAO might be a target sitting in pretty long future due to some difficult situation in the East Asian region. Still we EAMA-6 attendants share the strong feeling that the time has come to start serious discussion aiming our common target: **EAO**.

II. WHY DO WE NEED EAO ?

(a) Promotion of Cutting-edge Astronomy in East Asia

EAO will enable us the joint development, construction and operation of attractive and world-level telescopes/facilities in the EA region which individual countries or regions can not achieve if they are separated each other. The European countries have already a long history of united activity as ESO, and USA is also promoting close international cooperation

with neighboring countries like Canada etc. strongly. The size of astronomical facilities had already become quite large both in ground-based and space-born, and the Asian countries will stay minor partner throughout the future of astronomy if we stay separated.

(b) Platform for Various Types of Joint Projects

EAO will work as a platform to promote various joint projects in various sizes such as development of telescopes, instruments, software, database, new technologies etc.

(c) Cooperation of Science, Sharing Resources, and Exchange

EAO will promote cooperation of astronomy in various fields and various styles. It will coordinate the sharing of resources in the EA region such as telescopes, instruments, facilities etc. It will organize exchange of astronomers systematically, especially those in young generation.

(d) Form a Solid Third Party in the world Astronomy

Asia needs good presence in the world, not only in the economy but also in the intellectual and scientific fields like astronomy.

III. WHY EAST ASIA ?

Some questions might be raised, why it should be **East Asia**, instead of **Asia**?

We propose to stay on East Asia as a core region for this kind of difficult and sensitive future discussion, at least for initial phase of organization due to the following reasons.

(a) **“Asia” is Very Broad, and the Boundary is Not Clear**

If we involve too many countries the discussion will not be productive. We have the IAU-Regional Meeting for the purpose of cooperation through the Asia-Pacific region.

(b) **We are Neighbors, Sharing Common Culture**

As symbolized by this Chinese idiom which all of us understand, we are neighbors but not only neighbors. We share tremendous amount of common cultural background which make us easy to understand each other.

(c) **We are in Close Level of Astronomy and Science**

All of us already learned about the remarkable progress of astronomy in all four regions in this EAMA-6.

(d) **We have to Start from Firm and Reliable Cooperation, Step by Step**

We already have a long history of EAMA and various kind of cooperation, and we are ready to move to the next step.

Of course we are not to intend to refuse other countries/regions. In future, if the EAO organization went well, we might be able to consider to inviting other countries/regions stepwise.

IV. ANY MODEL ?

ESO / ESA could be our model. The characteristics of the ESO such as

- equal-based consortium
- diplomatic organization based on the treaty
- constant funding from member counties

are quite attractive for the future East Asian Observatory. We recognize, however, situations in East Asia different from those in Europe:

- East Asian countries do not have direction to unite together like EU;
- We still have many difficult political and historical matters;
- We may consider the space astronomy as well as the ground-based astronomy.

We therefore need tremendous efforts and long time to accomplish our target (EAO). Still the target is valuable enough for us to seek for!

V. FROM EAMA TO EAO

Let me briefly summarize the history of EAMA.

1990 1st “NEAMA”: “Star Forming Regions”

(Huan-Shang, China) 50 attendants from China, 15 from Japan, 3 from Korea Awareness of importance of cooperation in East Asia. Attendants agreed to coordinate NEAMA (North-East Asian Astronomers Meeting) constantly.

1992 2nd NEAMA: “Millimeter-Wave and Infrared Astronomy”

(Yusong, Korea) 100 astronomers from Korea, China, Japan, Taiwan, and USA Active exchange and discussion were made including many graduate students. Attendants agreed to extend “NAEMA” to “EAMA” to include more countries /regions.

1993 “Site Experiments for Astronomical Observations in North-West China”

24 attendants from four regions.

1995 3rd EAMA: “Ground-Based Astronomy in Asia”

(Tokyo, Japan) 215 attendants from 13 countries and 210 papers Attempt to extend to other Asian countries, but we found it difficult and somewhat desultory.

1999 4th EAMA: “Observational Astrophysics in Asia and its Future”

(Yunnang, China) 118 attendants from 13 Asian countries Attendants discussed cooperation on small/medium telescopes /instruments in EA.

2001 5th EAMA: “EAMA Core Meeting”

(Taipei, Taiwan) A compact meeting of EAMA with 60 attendants from four core regions Attendants discussed the future direction of EAMA intensively. Attendants agreed to form the EAMA Coordination WG, EAMA home page, promotion of young astronomers exchange and seek for possibility of a middle-size Asian IR Telescope.

2002 EAMA Young Astronomers Meeting

(Yangming-Shan, Taipei) 1st and very successful attempt of EA young astronomers meeting with 80 attendants

2004 6th EAMA: “Asian View of Cooperation in Astronomy”

(Seoul, Korea)

Here we see our history of “trial and error” grouping for the way of cooperation in the EA region. The basic idea of NEAMA/EAMA in its early phase can be summarized as follows:

- 1) Promote cooperation of astronomy in East Asia step by step;
- 2) Promote small but realistic cooperation as well as mutual understanding/exchange;
- 3) Concentrate mainly on observations and instrumental/telescope development; and

- 4) China, Korea, Taiwan and Japan as core regions (neighboring regions!).

And feel now that we are in the right time to discuss the “EAO” as our common target.

VI. WHERE ARE WE STANDING?

We already achieved a lot of progress for the EA cooperation in this meeting.

Working groups under discussion to organize are:

- EAMA Steering Committee (for overall direction/organization of EAMA activities)
- EA VLBI Consortium Committee ifor the EA VLBI network)
- ALMA WG ifor EA science advisory committee and EA Regional Center (EARC)
- 2m Class Telescope WG (for cooperation among nearly ten EA 2m-class telescopes)
- IR Telescope WG (for construction of 2-3m class East Asian IR telescope in China)
- EA Journal WG (for possible joint publishing of astronomy in EA)
- EAYAM WG (for organization of EA young astronomers meeting)

Having those working groups, the cooperation activities of EA astronomy will be much wider and more concrete. For example the VLBI EA network will connect many antennas in Korea, China and Japan with top-level correlator, and it will be jointly operated. The ALMA WG will coordinate the ALMA EA Regional Center for the joint operation and joint science. We already have close engineering cooperation of ALMA receivers among NAOJ, ASIAA and PMO. The 2m Class Telescope WG will also coordinate joint/cooperative observations and exchange of instruments among nearly ten telescopes in Korea, China, Taiwan and Japan. An attempt to build a low-cost 3m-size telescope for the East Asian telescope was made successfully in University of Nagoya by Dr. Kurita and Prof. Sato.

VII. A PROPOSAL TO ORGANIZE AN ASSOCIATION OF CORE OBSERVATORIES IN THE EA REGION

To promote the further activities discussed and proposed in the EAMA-6 such as exchange/share the telescope time, efficient exchange of staff and students, and support the joint small projects and meetings etc., we realize that we need regular coordination among the main observatories in the EA region. Also we should have closer contact by those leading observatories for future joint projects in EA and for discussion toward the future direction of EA astronomy such as organization of East Asian Observatory.

Based upon such consideration Zhao Gang (vice director of NAOC), Cho Se-Hyong (director of KAO), San Kwak (director of ASIAA), and Norio Kaifu (director of NAOJ) jointly propose here to organize an association of those four core observatories to accomplish activities which we are aiming at.

The East Asian association of core astronomical observatories/institutes can be organized through an MOU signed by:

- National Astronomical Observatories of Chinese Academy of Sciences (NAOC)
- National Astronomical Observatory of Japan (NAOJ)
- Korea Astronomical Observatory (KAO)
(*The KAO was renamed to be KASI: Korean Astronomy and Space Science Institute*)
- Academia Sinica Institute of Astronomy and Astrophysics (ASIAA)

The observatories association will perform activities such as:

- Directors meet regularly (at least once a year);
- Discuss and promote cooperation of astronomy in EA, as well as joint projects and future direction;
- Discuss and promote exchange and share of resources in EA;
- Support the EAMA and other activities to promote cooperation in EA; and
- Other related activities.

We wish to discuss this proposal with respective communities and try to draft the MOU.

Having such core observatories association the EAMA activities will be much easier and stronger through the support by the observatories association. While the EAMA WGs act for individual subjects, and the EAMA Coordination WG discuss and help organization of all EAMA activities including symposium etc., while the observatories association supports such activities, solve the formal subjects like telescope time sharing, agree on proposed joint projects, etc. Both bodies will cooperate in the discussion toward the future including EAO.

This will certainly be the next advanced step of EA cooperation of astronomy. I suppose, however, that we need at least one more intermediate phase before we reach to the EAO stage. It might be in the form of somewhat more concrete organization made by core observatories/institutes (say, United EA Observatories) plus some funding mechanism to support the larger size activities. It is difficult to foresee the actual process, but it might be achieved through some sort of large, joint project(s). VLBI, ALMA, ELT, SKA, ... whatever it (they) will be.

VIII. ROADMAP

Figure 1 shows a possible roadmap toward the East Asian Observatory.

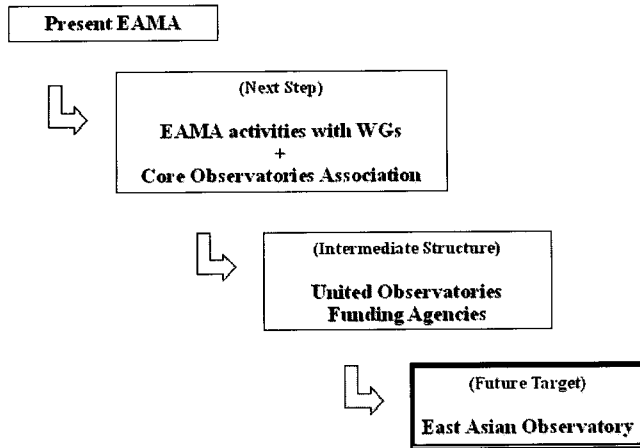


Fig. 1.— A Possible Roadmap toward the East Asian Observatory