EACOA and EAO : Aspirations for all of Asia

Paul Ho, ASIAA and EAO

EAMA11: A gap of 9 years

- **EAMA10 was last hosted at Seoul National University in 2016**
- **How did the EAMA meetings Begin?**
- **How did EACOA and EAO come into being?**
- **How shall we continue into the next decades?**

1. EAMA and its Growth

1-1. Start of EAMA



Continuous organization of China-Japan-Korea astronomer's meetings was proposed by Se-Hyung Cho 趙 世衡

1990 "Star Forming Regions"
@ Huangsan, China
Organized by
Cai-pin Liu 劉 彩品
Norio Kaifu 海部 宣男
(50 from China, Japan, Korea)



Overview of EAMA Symposia

(attendee)

1990 **"Star Forming Regions"** Huangsan, **China (Start of EAMA)** (50)

1992 **"Millimeter-Wave and Infrared Astronomy"** Daejeon, **Korea** (100)

1995 **"Ground-Based Astronomy in Asia"** Tokyo, **Japan** (215)

1999 **"Observational Astrophysics in Asia and its Future"** Yunnan, **China** (118)

2001 **"EAMA Core Meeting"** Taipei, **Taiwan** (**discussion for organizing** EAYAM

▸ **2003 EAYAM −1 2003)** (60)

2004 **"Asian View of Cooperation in Astronomy"** Seoul, **Korea, EAVN Consortium** established and **EACOA, ALMA, EAYAM WG** proposed (130)

▸ **EACOA** established, KASI 2005

2007 **"East Asian Network of Astronomy: Research, Education and Popularization"** Fukuoka, **Japan** (140)

2010 **"East Asian Network on Astronomy"** Shanghai, **China** (100)

2013 **"Cooperation on Current and Future Astronomy"** Jhongli, **Taiwan** (140)

▸ **EAO** was established by EACOA in 2014

2016 **"The 10-th East Asian Meeting on Astronomy"** Seoul, **Korea** (149)

1-4. Proposal of EACOA, and EAO in Future (2004)

Present EAMA

Proceedings of EAMA-6
@ Seoul 2004, N. Kaifu

(Next Step)
EAMA activities with WGs
+
EA Core Observatories
Association (EACOA)

(Inter… …ories
…g Agencies

(Future Target)
East Asian Observatory

A Letter from EAMA-6 which recommended establishment of EACOA was sent to directors of NAOC, NAOJ, KASI, and ASIAA

EACOA Established in 2005



This was Norio Kaifu's Vision

What is ASIA trying to Accomplish?

EACOA Status & Prospects

- **Timeline:** **EACOA officially formed in 2005**
- **Mission:** **to Organize and Promote East Asian Astronomy**
- **History:** **Many Years of Efforts from Norio Kaifu & Friends**
- **Activities:** **Meetings, Workshops; EA VLBI Network; EA Site Surveys; EACOA Fellows; EACOA-CSO initiative; EAO/JCMT**
- **Prospects:** **How to sustain/grow East Asian Observatory**
- **Purpose?** **Increase Regional Resources: Funds, Manpower, Jobs**

— EACOA is meant to "include, and be for" all of Asia —

— EACOA is meant to be about our Joint Vision —

First 10 years for EACOA :

Finding our way Forward

— beyond just holding meetings —

- **Site Survey and Development:** **Ali Site in China; started 2002?**
- **How to "Share" Funding:** **EACOA Fellows (5 year posts); started 2012**
- **Working with "Asymmetric" Funding:** **CSO (90 nights); started 2013**
- **"Committing" to Joint Operations:** **EAO incorporated in Hawaii in 2014**

  JCMT operations started 2015

  NAOC (0.5M); NAOJ (0.5M); KASI (0.3M); UK (0.8M); ASIAA (0.3M)

— This has been the main exercise of the last 10 years —

New Partnership *(it took 16 months to implement)*



Vancouver Airport, 20th December 2013

A Major Move 10 Years Ago: EACOA establishes EAO 03.23.14



Goals of EAO - Repositioning

Mission Statement

The EAO (East Asian Observatory) is formed by EACOA (East Asian Core Observatories Association) for the purpose of pursuing joint projects in astronomy within the East Asian region. In the era of very large scale astronomical instruments, East Asia will be competitive internationally by combining their funding resources, their technical expertise, and their manpower. The intention of EAO is to build and operate facilities, which will enhance and leverage existing and planned regional facilities. The intention of EAO is to raise funding and to build an observatory staff, separate from that of the EACOA institutions. As partners of the EAO, the EACOA institutes will help to establish the funding and to oversee the governance of EAO. The communities represented by the partners in EAO, would have full access to all EAO facilities.

Lessons from ESO

- **ESO Declaration (1954) predates EEC (1958) and EU (1993)**
- **ESO is more than 50 years old**
- **ESO Annual Budget comes from "Government Budgets"**
- **ESO Annual Budget is on the order of NAOJ or NAOC**
- **ESO Supports Large and Small Facilities**
- **ESO has "EU" Facilities and "Joint" Facilities (eg ALMA)**
- **ESO Facilities "Complement Member Facilities"**
- **ESO has ~730 staff members**
- **EU Scientists are very mobile within EU**
- **Budget ~10^{-5} "total" GDP**

- **EAO Founding Members are "Better Prepared" than ESO Founding Members in 1962 (technically, financially)**
- **sometimes forgotten: ESO was very unstable in the beginning**

So Why does EAO Target JCMT?

- **EACOA Institutes will share funding and responsibilities**
- **JCMT will continue its strong science programs**
- **Minimum Risk in "Performance"; Cost can be managed**
- **JCMT can complement our facilities; New Science possible**
- **Finding Chart for ALMA Science**
- **Wide-Field Continuum Imaging Unique**
- **Will be An Exercise in "Joint Funding" in East Asia**
- **Will be a "Driver" to Accelerate EAO Future**
- ***or* Were the Directors *just plain Crazy*? ….still possible…..**

- **JCMT was an "Exercise/Investment" for the Future**
- **JCMT was "not a scientific requirement" for EACOA**

EAO-Hawaii ?

TMT

Keck

IRTF

Subaru

SMA

JCMT

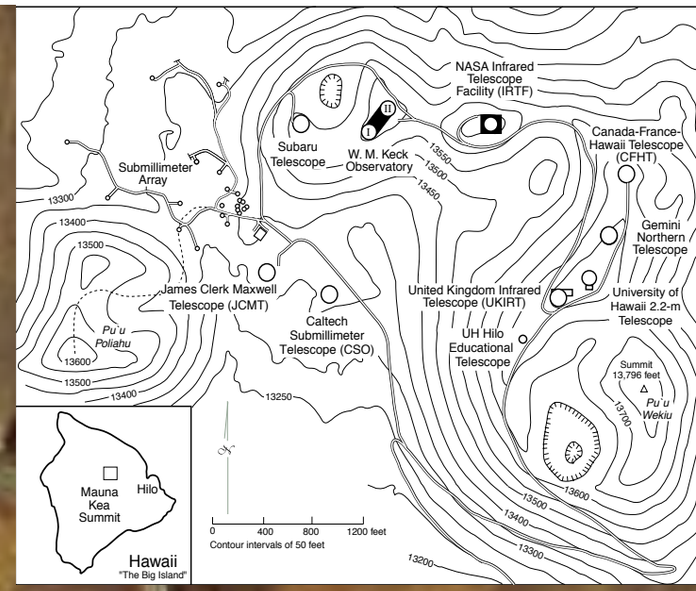
CSO

CFHT

Gemini

UH

UKIRT



EACOA Prospects :
Strength through Linkage

- **EAO-Hawaii would Access Co-Located World Class Facilities**
- **EAO-Hawaii would be Northern Counterpart to ESO-Chile**
- **EAO-Hawaii would be forerunner for EAO-Ali**
- **EAO facilitates joint training, joint technical developments, joint science projects, future collaborations, future constructions**
- **EAO facilitates joint funding, just like ESO, for mega projects**
- **EACOA Goal: <u>Compete</u> & <u>Collaborate</u>, regionally & globally**

Regional Resources in 2014 (within EACOA)

Institute	NAOC	NAOJ	KASI	ASIAA
No. of Staff	560	586	319	196
Ph.D. Scientist	282	>424	231	95
Postdoc	42	37	21	43
Ph.D. Student	187	70	12	26
Budget (USD)	-100M	150M	51M	16M

Additional Resources Exist Outside of EACOA Institutes

Main Idea was to get EACOA Institutes to contribute 1% of their budget for the future.

1-6. Establishment of EAO (2014)

Roles of East Asian Observatory

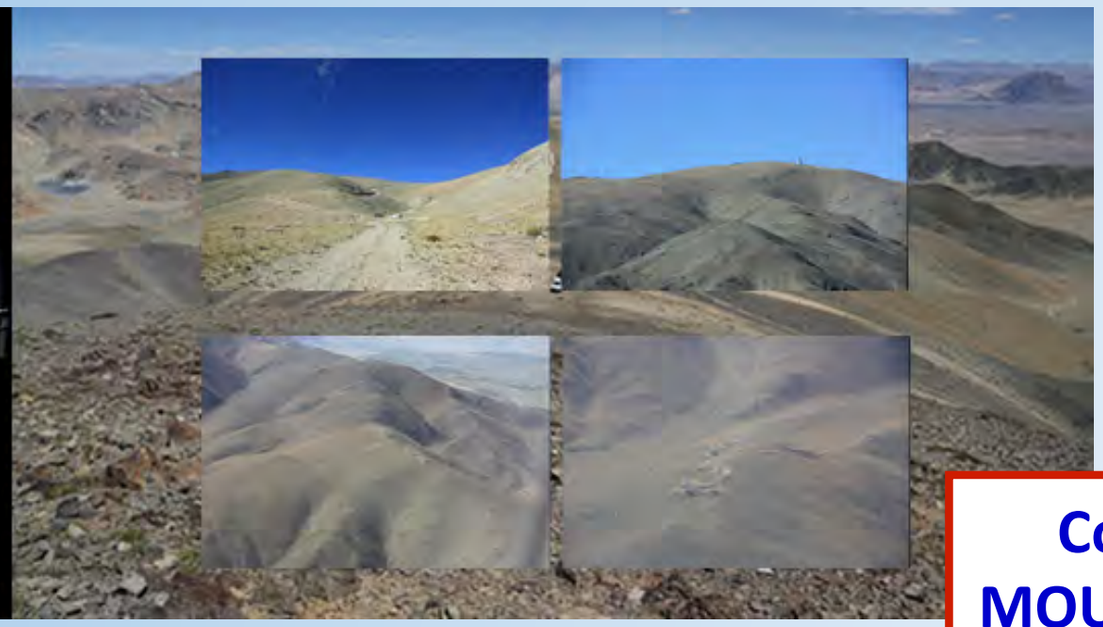
Operated by EACOA Observatories: NAOC, NAOJ, KASI, ASIAA

to…..

- **Jointly operate JCMT @ Mauna Kea**
- **Involve other large telescopes into joint operation**
- **Foresee future new joint projects as a "Third Party"**

(⇒ "Report on EAO" by Dr. Paul Ho)





Conclusion of MOU for EAO, 2014

3-3. Planned Major Regional Cooperation

Future of Asia-Pacific Astronomy

TMT (Japan, China, India, …)

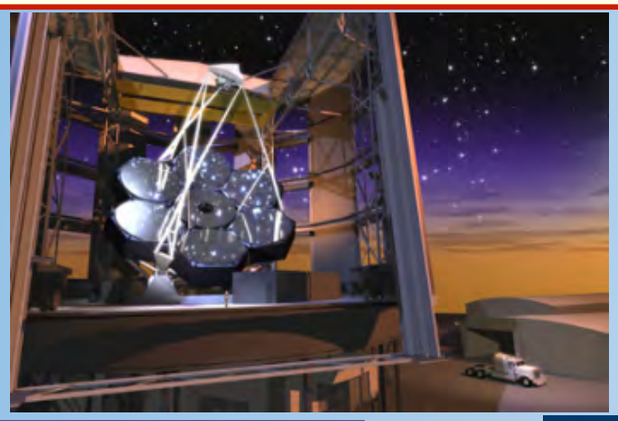
GMT (Australia, Korea, ….)

SKA (Australia, New Zealand, China, India, …)

SPICA (Japan, Korea, ….)

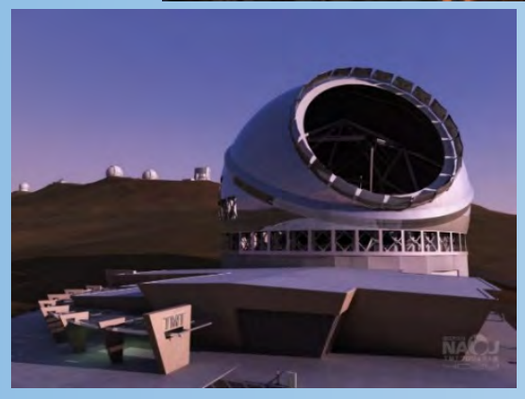
Antarctic Astronomy (China, Japan, Australia, NZ, …)

Mauna Kea (**EACOA**: China, Japan, Korea, Taiwan)

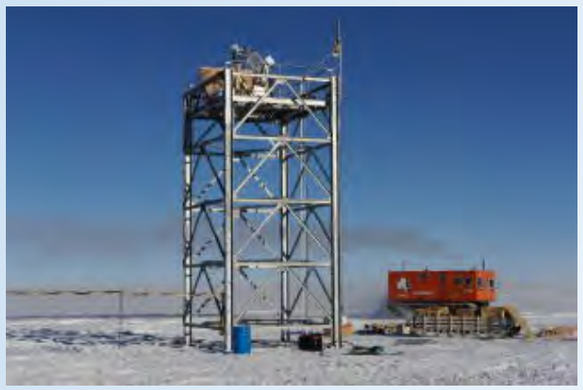












3-3. Current Ongoing Major Regional Cooperation

VLBI **VERA-KVN** (Korea + Japan)
East Asian VLBI (Korea + Japan + China +….)
APT: Asia-Pacific VLBI (Australia + China + Japan + Korea…)

JCMT **Mauna Kea** (**EACOA_EAO**: UK, China, Japan, Korea, Taiwan)

ALMA **EA-ARC** : East Asian ALMA Research Center
(Japan + Taiwan + Korea + China + ….)





New Partners? Trend in Asian Regional GDP

	2018	2021	2026	5-YR
	GDP(IMF): B $	GDP (IMF): B $	projected GDP (IMF): B $	Growth Rate: %
USA	20,527	22,996	29,166	27
CHINA	13,841	17,745	24,295	37
JAPAN	5,041	4,933	5,010	2
SOUTH KOREA	1,725	1,811	2,048	13
TAIWAN	609	775	997	29
THAILAND	507	506	673	33
CAMBODIA	25	26	39	50
MALAYSIA	359	371	577	56
MYANMAR	67	65	75	15
PHILIPPINES	347	394	531	35
SINGAPORE	377	397	513	29
VIETNAM	303	366	624	70
INDONESIA	1,043	1,187	1,762	48
INDIA	2,703	3,176	4,947	56

- South East Asian Economies are Expanding
- South East Asia also has Large Population
- East Asia + South East Asia >> U.S. or EU

Proposed Contributions ~ Ratio of GDPs
1% ESO means 10^{-7} GDP

Future for EACOA/EAO?

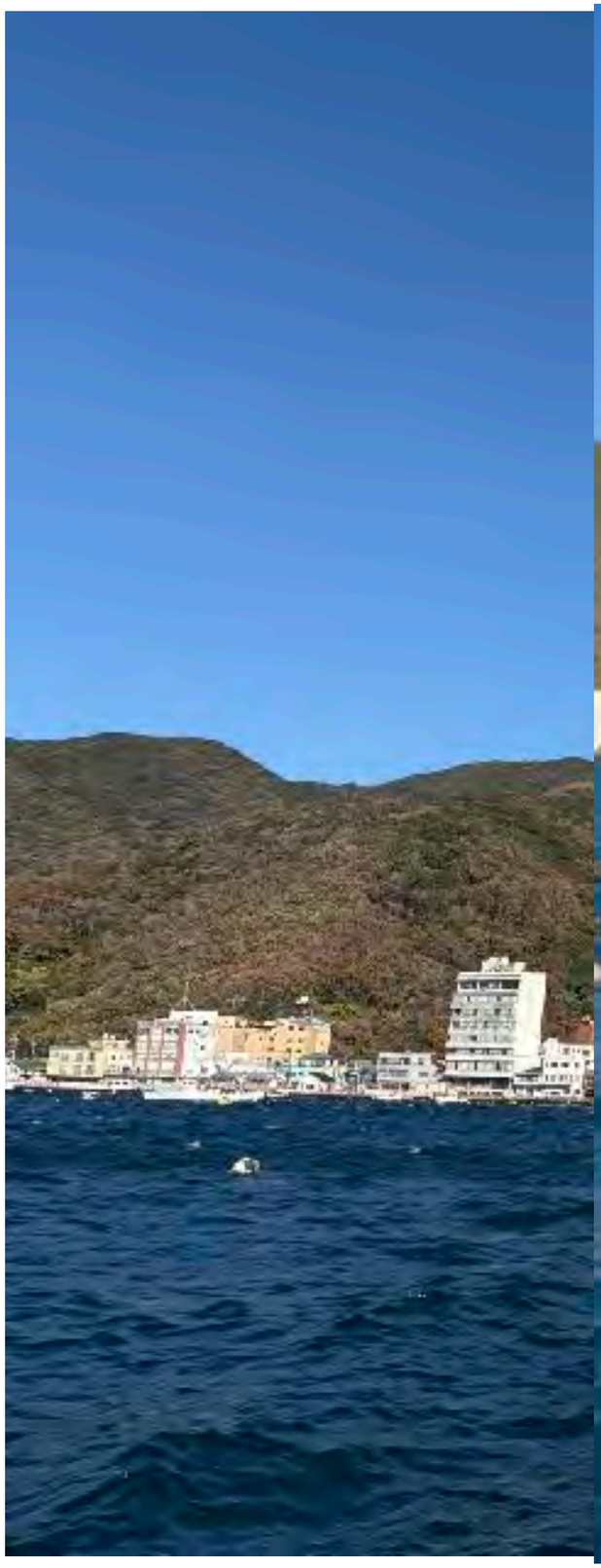
- **History of Development: Established (2005) 2014**
- **Model: Asian Counterpart to ESO**
- **EAO Members: NAOC, NAOJ, KASI, ASIAA**
  but note NARIT (2021: funds) and XAO (2025: staff)
- **How does EACOA/EAO evolve into the next decade**
  lose the "E" on "EA"
- **Current Status: Operations of JCMT are precarious**
- **Current Need: must Find Consensus again**
- **Future Plans: South East Asia will grow economically**

"A" Vision for East Asian Astronomy

- **Fundamental Vision:** Science and Technology *as* "Solution"
- **Fundamental Question:** Where to Invest *or* Why Astronomy
- **Fundamental Problem:** Brain Drain *from* Economic Growth
- **Boundary Conditions:** "Finite Money *and* Manpower"

- **Problem:** Astronomy as "Passive Science" is driven by Sensitivity
- **Strategy 1:** Derive Efficiency via Cooperation and Collaboration
- **Strategy 2:** Remove Boundaries (physical, political, bureaucracy)
- **Strategy 3:** Find Model, Find New Money
- **Strategy 4:** Build Trust, Distribute Benefits

What shall we DO ?







I Urge EAMA11 to Take Actions

Renew our Joint Vision for the Future

We must Continue to Grow Together

New Growth must come with <u>New</u> Commitments!

What will be You Duty?

We Dream, We Execute, so that We can Dream Again!

the “Better Times” shall always be in front of us,

the “Better Younger Ones” will always be behind us,

We should pave the road, and get out of the way!



