



Astronomy for development *(focusing on Ethiopia and Africa)*



Mirjana Pović
Ethiopian Space Science and Technology Institute
&
Instituto de Astrofísica de Andalucía



SEA 2020 (virtual)



*"I hear and I forget
I see and I learn
I do and I understand!"
- NASA Teachers training Ethiopia*

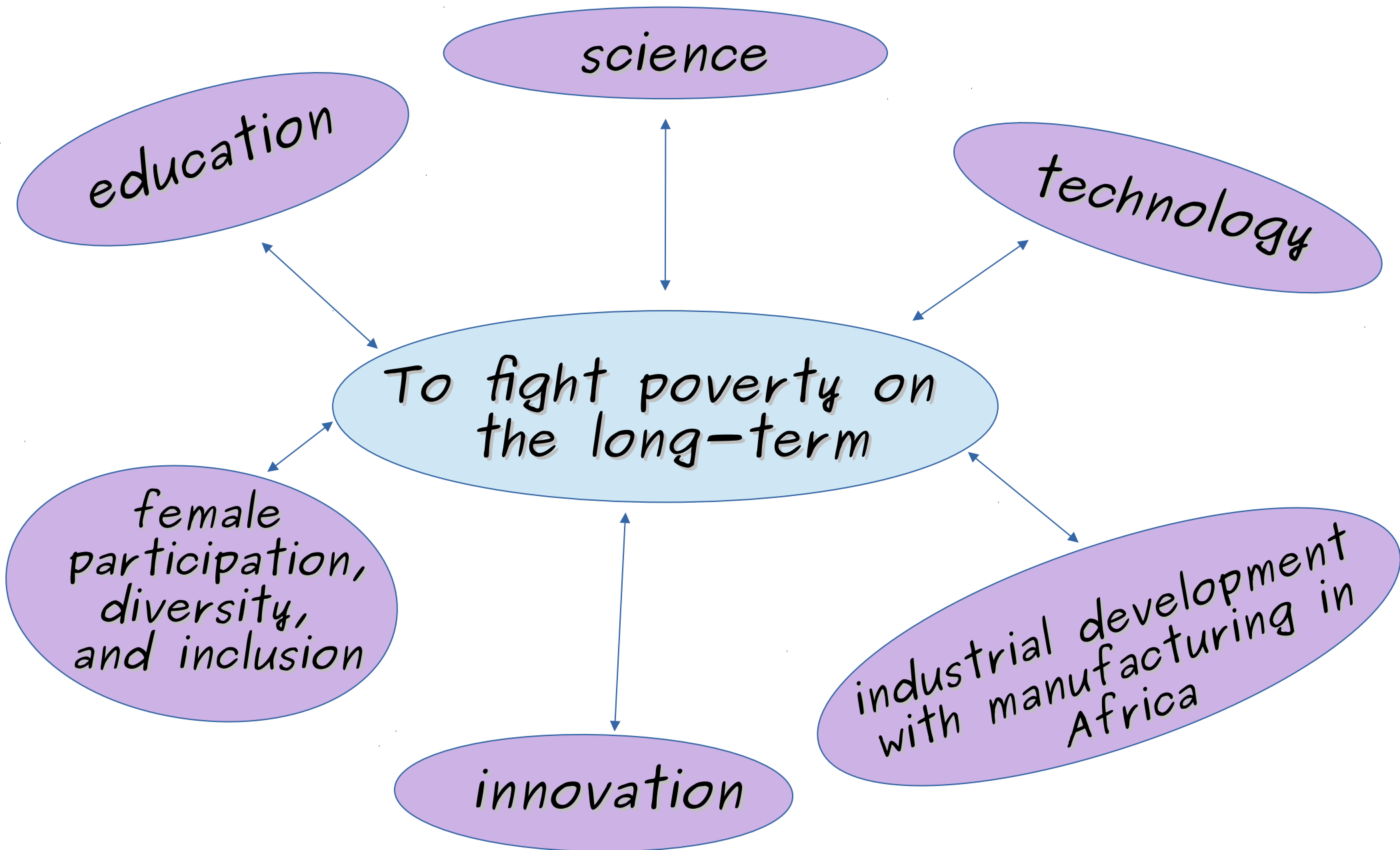
A&SS



Astronomy and Space Science in Africa ???



Re-thinking what humanitarian aid is??



A&SS important tool for development



- to promote education*
- to inspire-for
and to promote science*



- to contribute to economical growth
(South Africa as an example)*

- to bring technological development and innovation

- to promote peace through international collaborations
and long-term projects*

- our daily life nowadays depends on satellite data

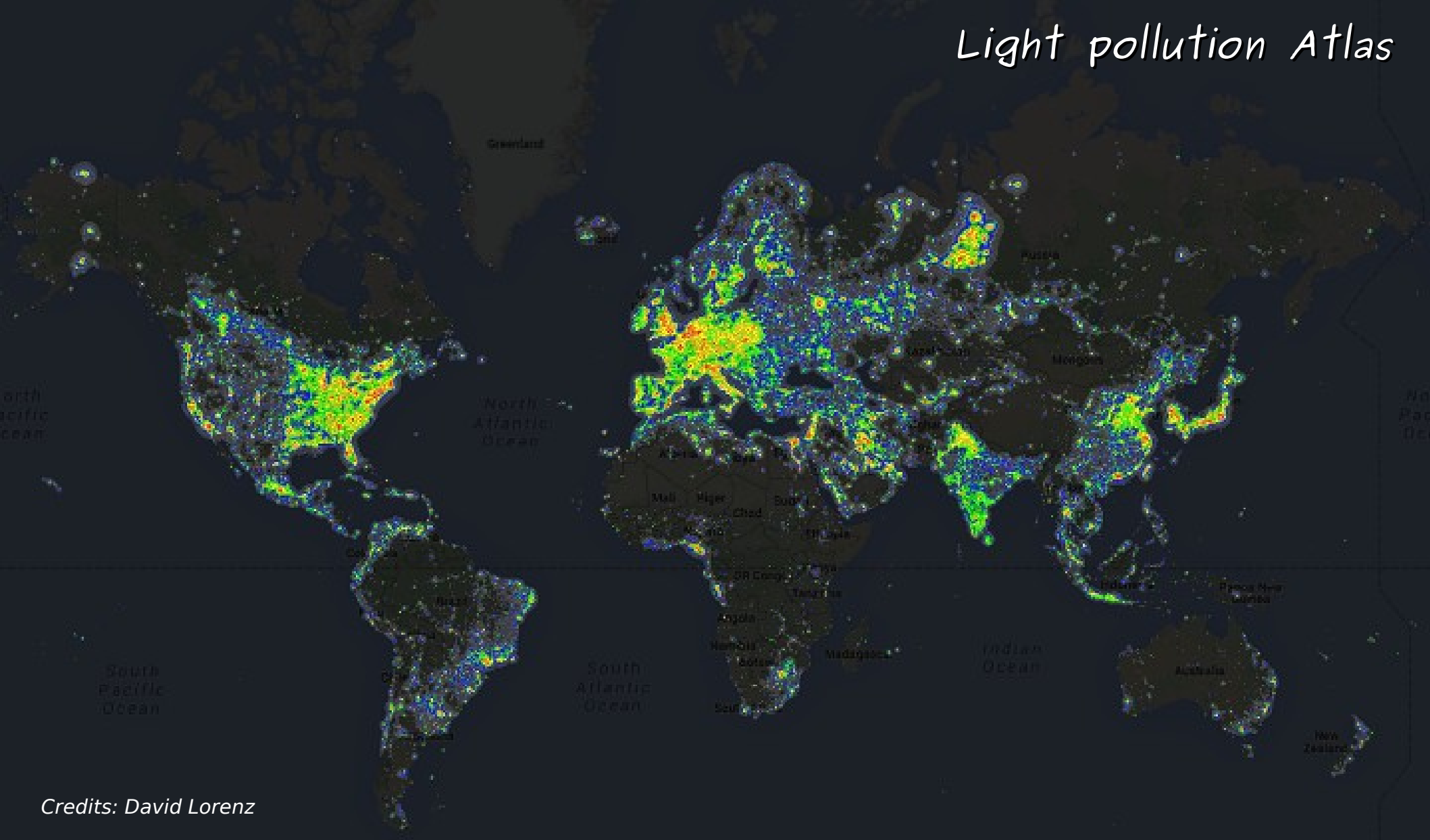
- space based data have application in almost all aspects of our society



why not A&SS in Africa?!!!

Africa has huge potential for astronomy development!!

Light pollution Atlas



Credits: David Lorenz

Dark sky as African natural resource!!

Continental initiative



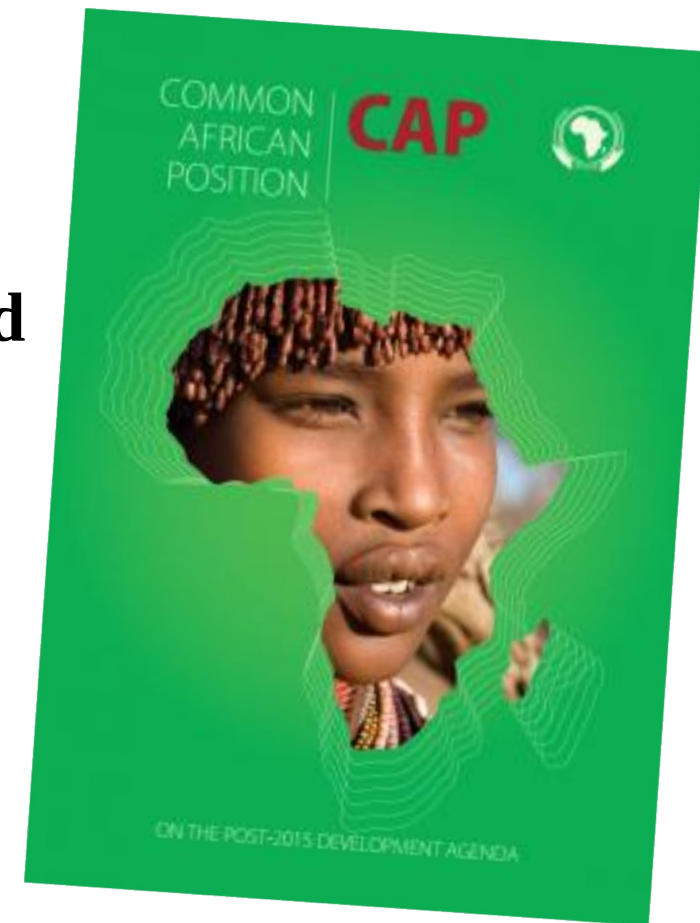
Common African Position on the Post-2015 Development Agenda

→ pillar 2 (out of 6): science, technology, and innovation
(through optimal utilisation of space and geo-spatial technologies)

– First African Space Strategy

(selecting: Earth observations, navigation and positioning, satellite communications, and space science and astronomy)

– Established **African Space Agency** in 2018
(based in Egypt)





To be the voice of astronomy in Africa and to contribute to addressing the challenges faced by Africa through the promotion and advancement of astronomy

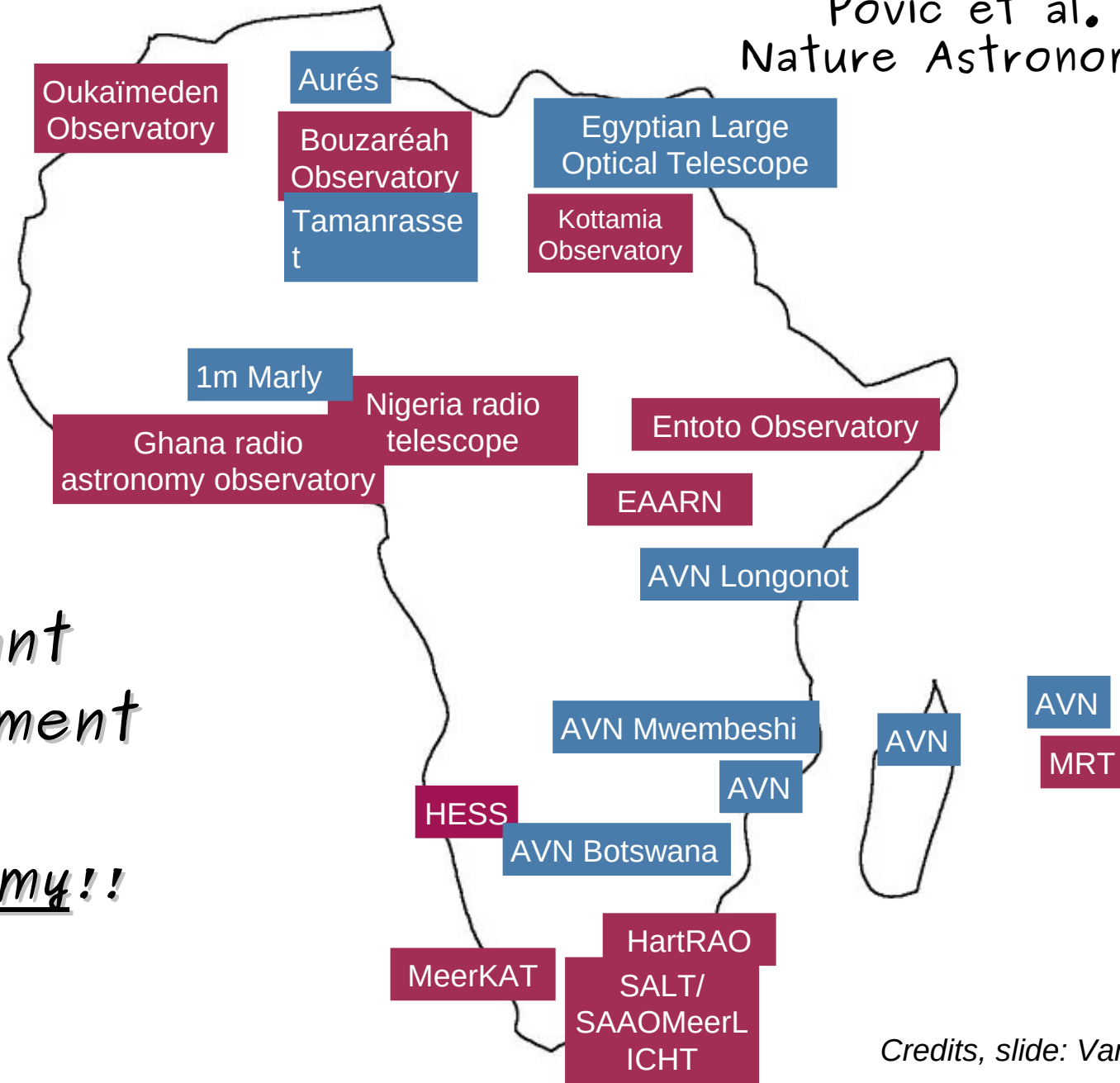


*AfAS
re-established*

*Cape Town,
March 2019*

Pović et al. 2018,
Nature Astronomy, 2, 507

Existing
Forthcoming

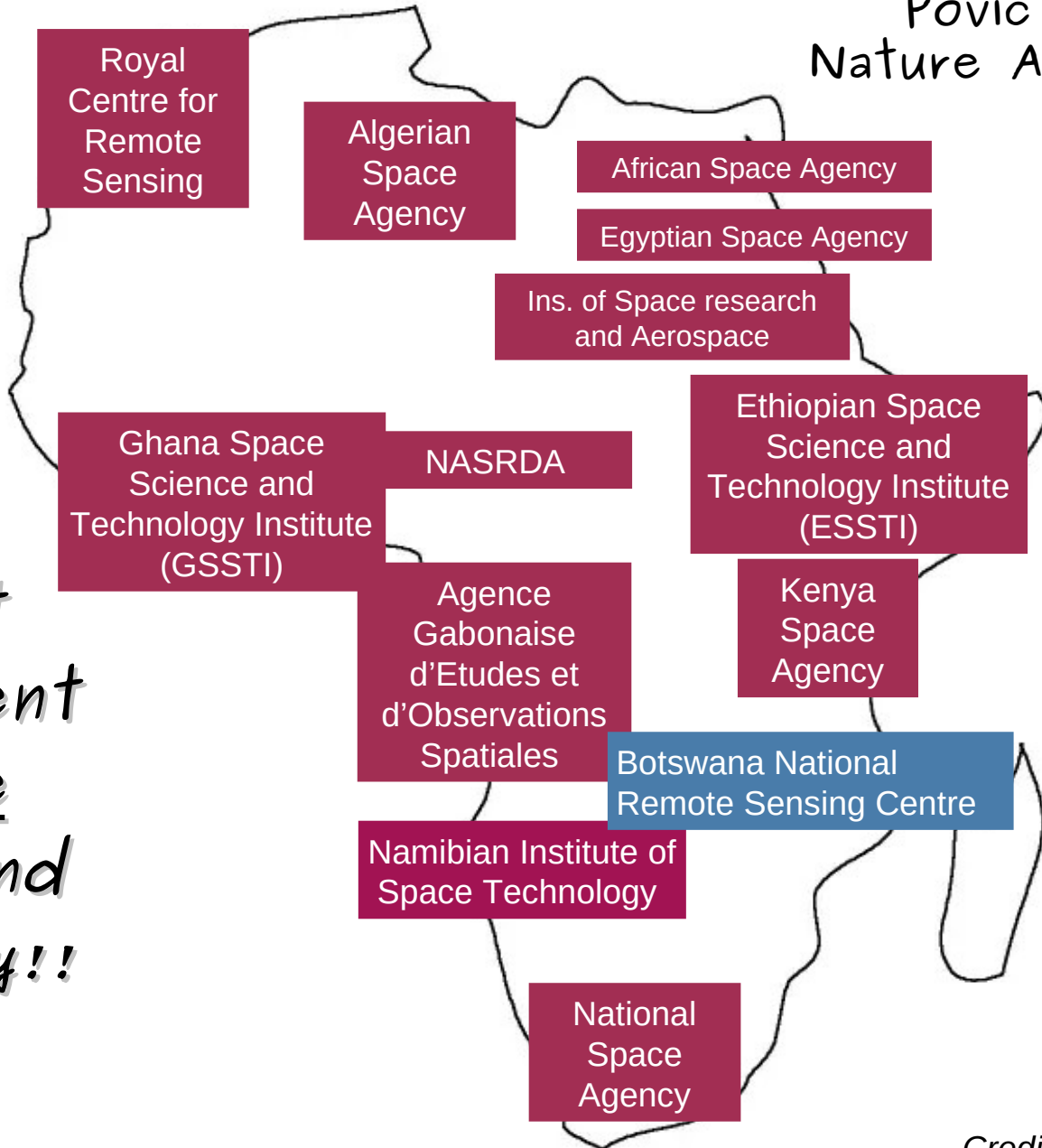


Important
development
in
astronomy!!

Credits, slide: Vanessa McBride

Pović et al. 2018,
Nature Astronomy, 2, 507

Existing
Forthcoming



Important
development
in space
science and
technology!!

Credits, slide: Vanessa McBride

Ethiopia
as an example



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Ethiopian Space
Science & Technology
Institute



We explore the Universe for the benefit of our people!!

**Vision: to use SS&T for improving the main challenges of Ethiopia,
and its socio-economic and environmental status**

- astronomy & astrophysics
- geodesy
- remote sensing
- space physics and applications
- space engineering
- satellite operations
- high performance computing and data administration



**ESSTI offices in Addis
Ababa**

**Entoto Observatory
(~ 10km out of Addis)**



Example: Astronomy for development in Ethiopia

Post-graduate program (MSc/PhD):
first MSc and PhD students in astronomy
(attached to some of public universities)

→ **improving the level of education in the country**



Some of our first Msc and PhD students



Training on Panchromatic Universe by Ignacio Garcia de la Rosa (IAC), 2017



Ghion Ashenafi, one of our engineers at Entoto



Human capacity building of our students and young staff members

→ **improving skills toward general socio-economic growth**

Example: Astronomy for development in Ethiopia

Research: 3 groups in extragalactic, stellar, and cultural astronomy

- first publications, knowledge generation
- science development
- strengthening international collaborations

Institutional development: establishment of departments, structure, creation of committees, guidelines developments, etc.

Proposals development, organisation of meetings/conferences, etc.

- **visibility** given to the ESSTI and Ethiopia
- HCB
- strengthening international collaborations
- institutional development
- funds mobilisation
- tourism





**IAU Symposium 356:
Nuclear Activity in Galaxies Across Cosmic Time**
7-11 October 2019
Addis Ababa, Ethiopia



4th Middle East and Africa IAU Regional Meeting, 2017

8th African Space Leadership Conference, 2019



Reflection on European-African research collaborations in A&SS: opportunities, achievements, challenges, and needs!

SKA

SOC: Mirjana Pavic, Vanessa McBride, Kevin Govender, Ernst Van Groningen, Phil Charles, and Nora Ann Brown, Klara

First EWASS SS on African-European collaborations, UK, 2018

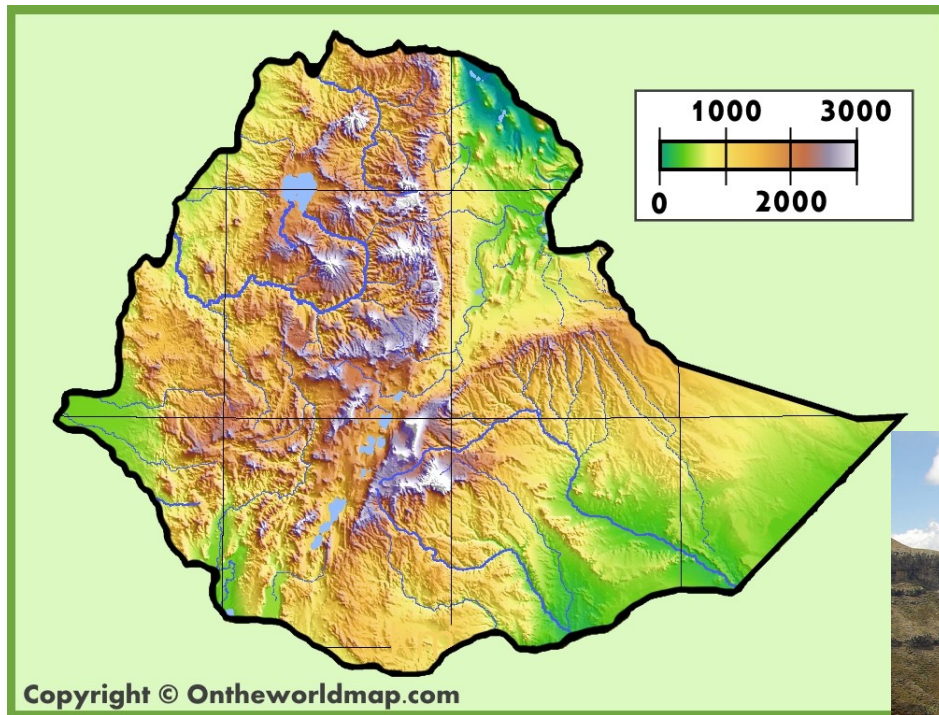
Example: Astronomy for development in Ethiopia

Entoto observatory, Lalibela site testing

- infrastructure development
- technological development



Entoto Observatory, 2 x 1m telescopes, near Addis Ababa



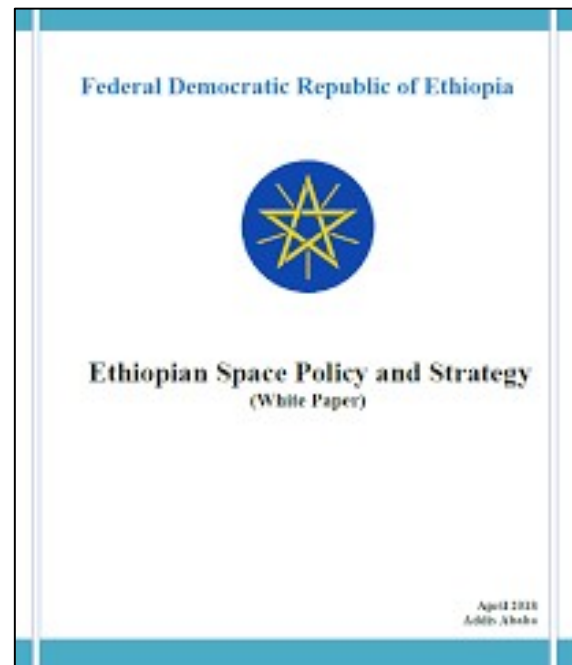
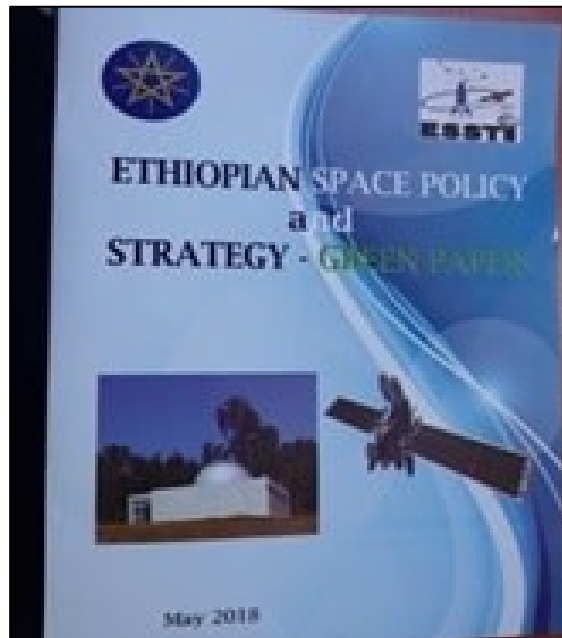
Abune Josef site testing, > 4000m, near Lalibela

Example: Astronomy for development in Ethiopia

Policy framework:

- First Ethiopian Space Policy and Strategy: green and white papers (published)
- Ethiopian Space Science and Technology Road Map (2021-2050)
 - under development

→ political engagement



Organised discussion on Space Policy and Strategy

Example: Astronomy for development in Ethiopia

Teachers trainings

- teaching teachers astronomy through NASE, but also how to teach astronomy using practical approach
- Network for Astronomy School Education, Galileo Teachers Training Program

- improving level of education
- promoting STEM
- road toward more equality



Example: Astronomy for development in Ethiopia

Education, outreach, public awareness:

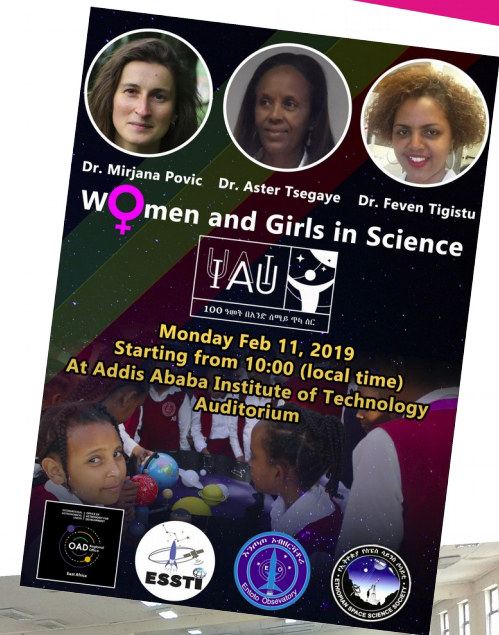
- schools visits
- public talks
- Entoto visits
- stargazing activities (in collaboration with ESSS)
- astrobus (in 2017 and 2019)
- 'Inspiring stars' - bringing astronomy to people with visual difficulties
- making national events out of astronomy (e.g., exoplanet naming, solar eclipse event)



Example: Astronomy for development in Ethiopia

Girls and women in science:

- STEM for GIRLS in Ethiopia initiative (through Nature Research for Inspiring Science Award)
- SEWiST activities
- African Network of Women in Astronomy (AfNWA) - coming soon!!



Example: Astronomy for development in Ethiopia

Astronomy and space science often can be a **source of hope** in countries such as Ethiopia



Ground station at Entoto (since 2019)

Some of continental (new) initiatives

HCB
through
ISP



The African
Initiative for
Planetary and
Space Science

HCB through
SKA and AVN

AfNWA



AfAS
African Astronomical Society

DARA
DEVELOPMENT IN AFRICA
WITH RADIO ASTRONOMY



OFFICE OF ASTRONOMY
FOR DEVELOPMENT

+ Regional offices:

E-ROAD +
EA-ROAD, SA-ROAD,
WA-ROAD


MATERNA
Mobility in Africa for Training,
Education and Research:
Network for Astrophysics

→ **Spanish-East Africa collaborations
initiative**

It's time for Africa!



XXXII IAU GENERAL ASSEMBLY

CAPE TOWN, SOUTH AFRICA, 2024

*The first IAU GA to be held in
Africa*

Thank you very
much for your
attention

