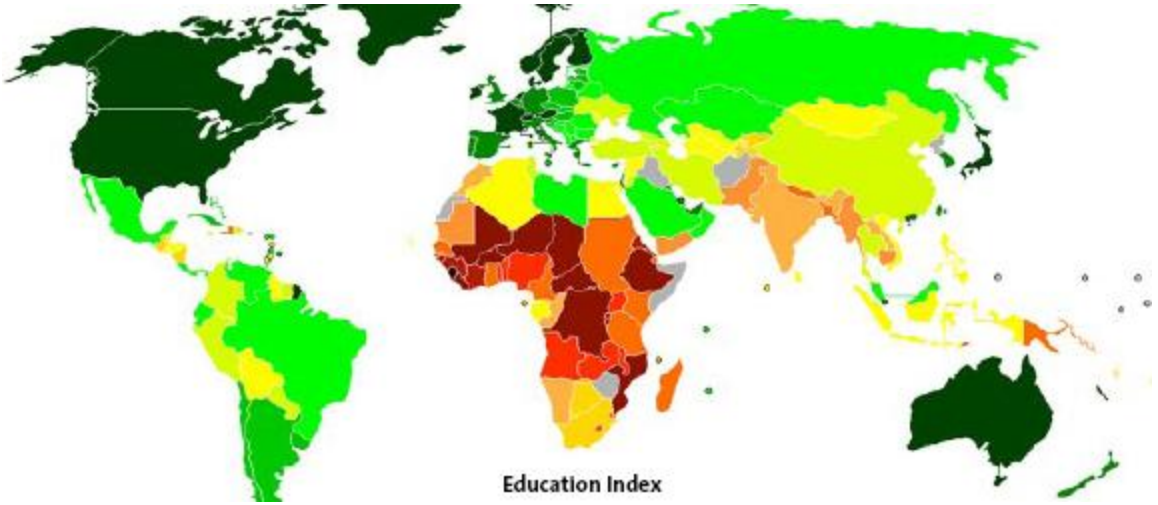
National Research Foundation | South African Astronomical Observatory

Astronomy for Development



Kevindran Govender
SALT Collateral Benefits Programme /
IAU Office of Astronomy for Development
kg@saao.ac.za
www.saao.ac.za

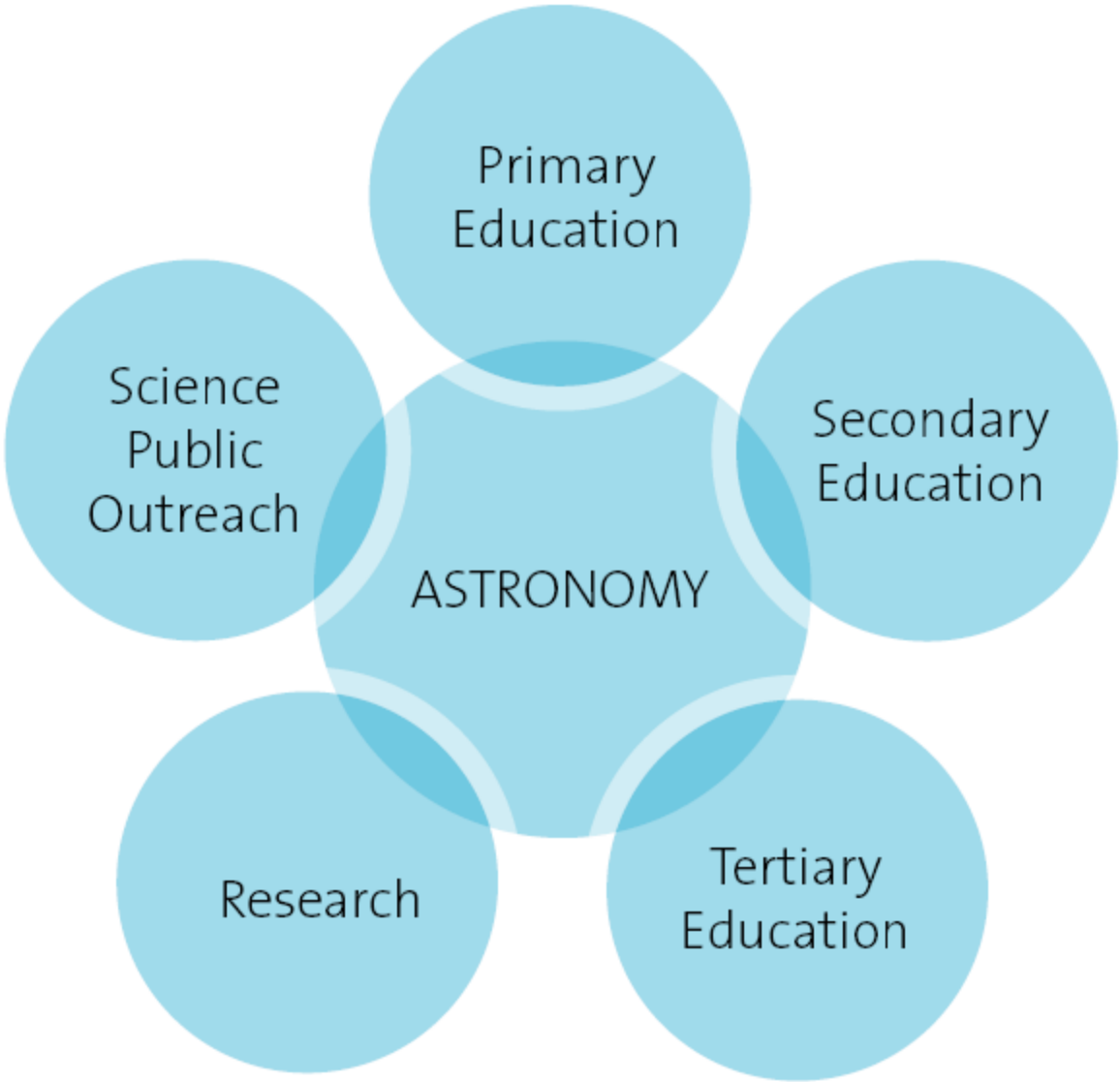
SOUTHERN AFRICAN LARGE TELESCOPE

BtSM 2011
Stellenbosch,
South Africa

IAU


International Astronomical Union
Astronomy for the Developing World
Building from the IYA 2009
Strategic Plan 2010-20
OPTICS
HIGH-PRECISION ADAPTIVE OPTICS
COMPUTERS
FASTEST HARDWARE COMPLEX SOFTWARE
CULTURE AND SOCIETY
ANTHRO-POLOGY
ANCIENT CIVILIZATIONS OUR ROOTS
TECHNOLOGY AND SKILLS
HISTORY
Evolution of UNIVERSE OUR ROOTS
ELECTRONICS
MOST SENSITIVE DETECTORS FASTEST CLOCKS
PERSPECTIVE
IMMENSITY OF UNIVERSE
TOLERANCE AND GLOBAL CITIZEN-SHIP
ASTRONOMY
SPACE
SATELLITES MINIATURI-ZATION PRECISION
INSPIRATION
CAREER IN SCIENCE AND TECHNOLOGY
PHYSICS
LABORATORY OF EXTREMES MAKING HEAVY ELEMENTS
MATHE-MATICS
ABSTRACT THOUGHT
CHEMISTRY
PRODUCING ORGANIC MOLECULES
BIOLOGY
BUILDING BLOCKS OF LIFE
SCIENCE AND RESEARCH
IAU

Elements of Astronomy Development…



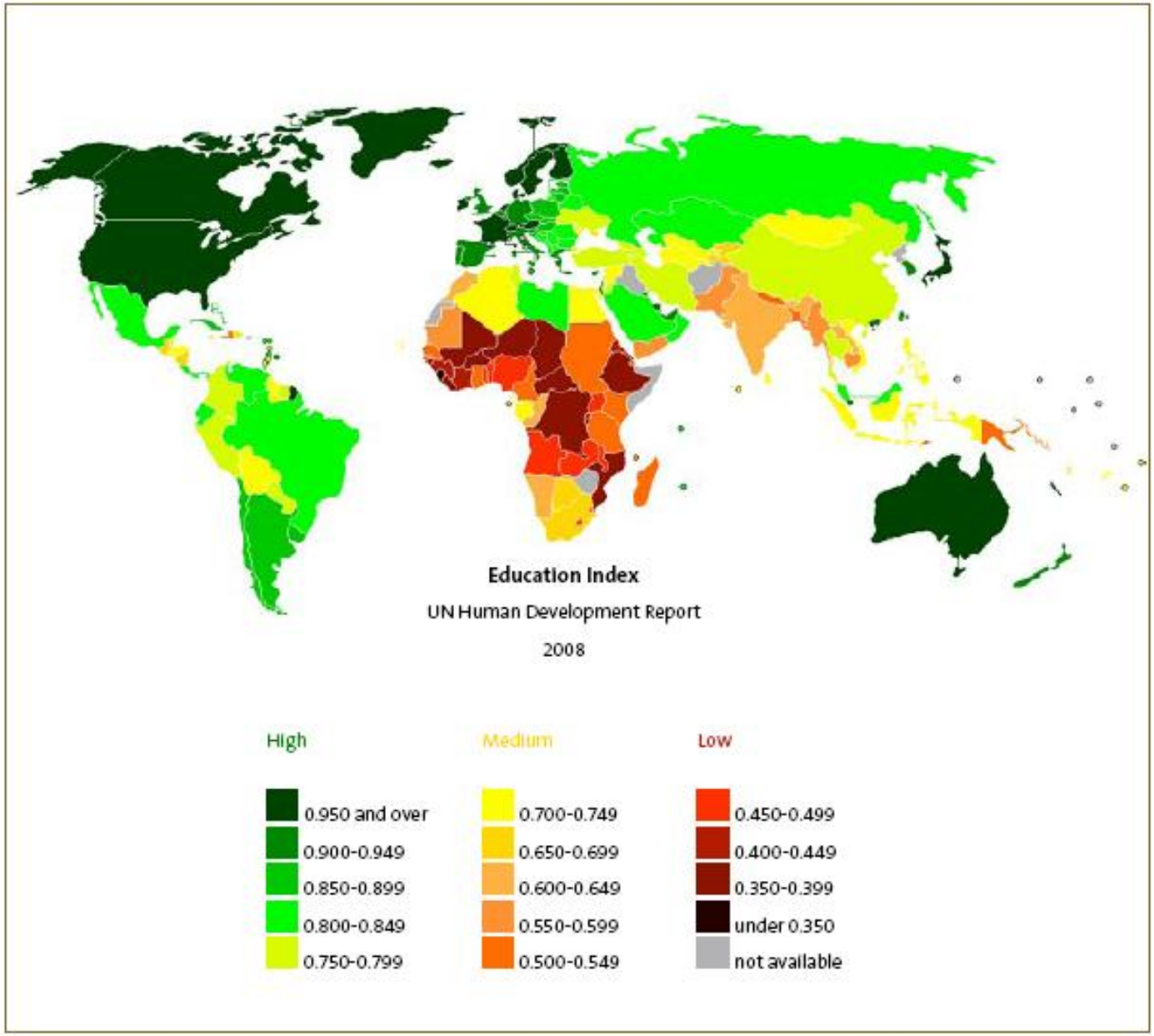


Figure 13

GLOBAL DISTRIBUTION OF EDUCATION INDEX

The education index is defined by E = 2/3 (L) + 1/3 (C), where L is the literacy rate and C is the combined gross school enrolment ratio. This is taken from the 2008 update to the 2007/2008 edition of the UN Human Development Report (2007, ISBN 978-0-230-54704-9).

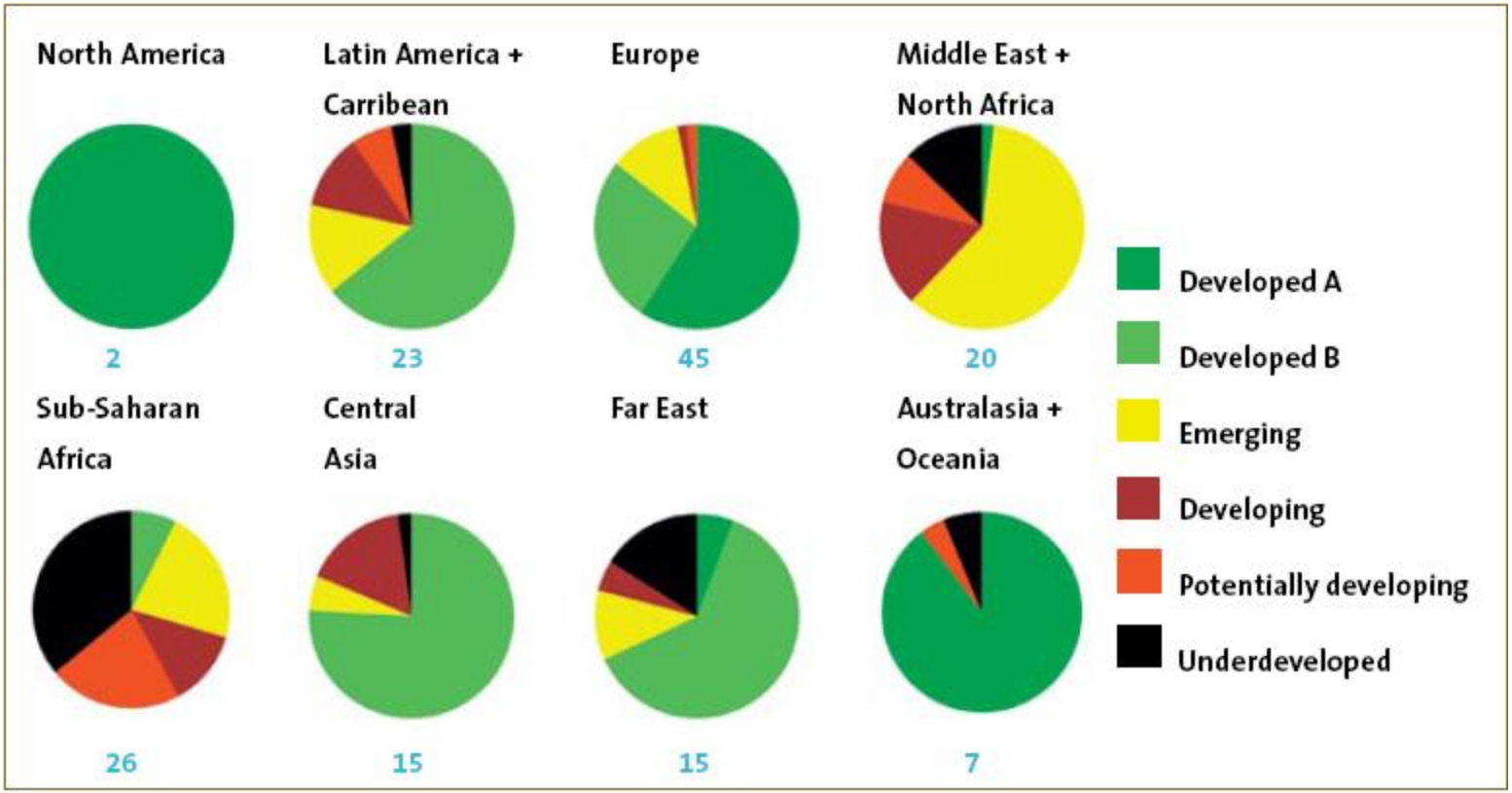


Figure 10

ASTRONOMY RESEARCH DEVELOPMENT BY REGION

Population in millions that inhabit countries at various stages of astronomy development in different regions of the world. The plots were compiled on the basis of data from Hearnshaw (2008, private communication). The number of countries included in each region is indicated in blue.

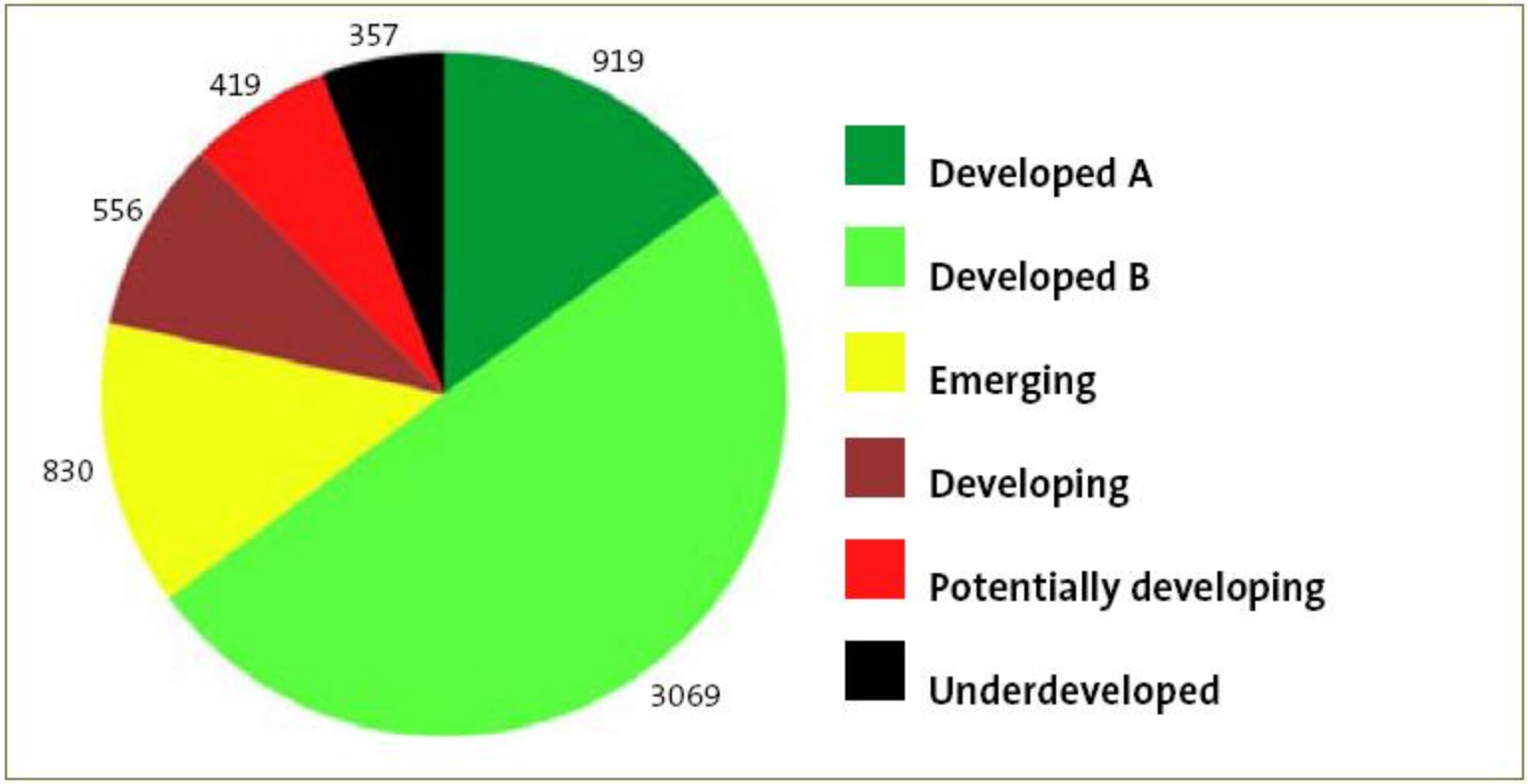


Figure 11

POPULATION IN COUNTRIES IN VARIOUS STAGES OF ASTRONOMY DEVELOPMENT

Number of inhabitants (million) in countries at various stages of astronomy development compiled on the basis of data from Hearnshaw (2008, private communication).

AFRICA

802984AI (R02109) 6-03

Astronomy for Development: The Africa Perspective

- **Education (especially Maths and Science)**
- **Development of Research**
- **Public Understanding of Science**
- **Development of Partnerships**
- **Astronomy for job creation (especially tourism)**

THINK

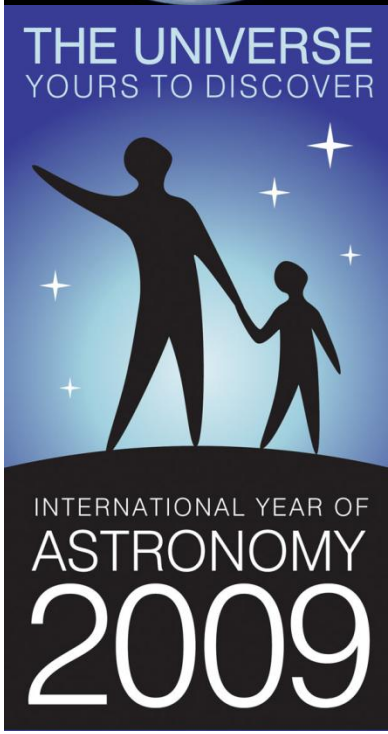
A Plan for Africa

Theme

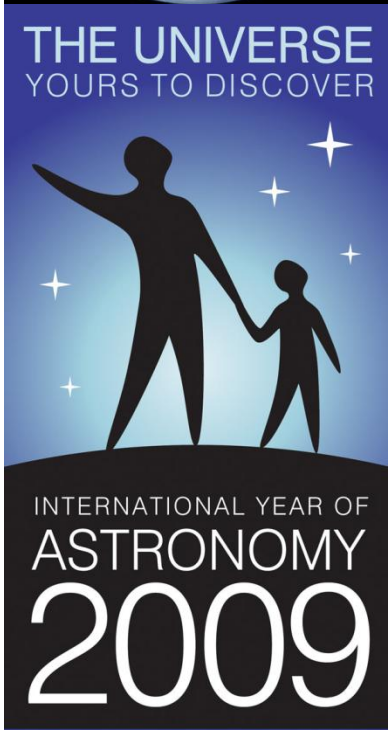
Astronomy for Education

Vision

The continent of Africa, with an ever-growing astronomy research community, united in the fields of education and outreach, working together and sharing resources, such that the people of Africa are educated, especially in the fields of science, engineering and technology.

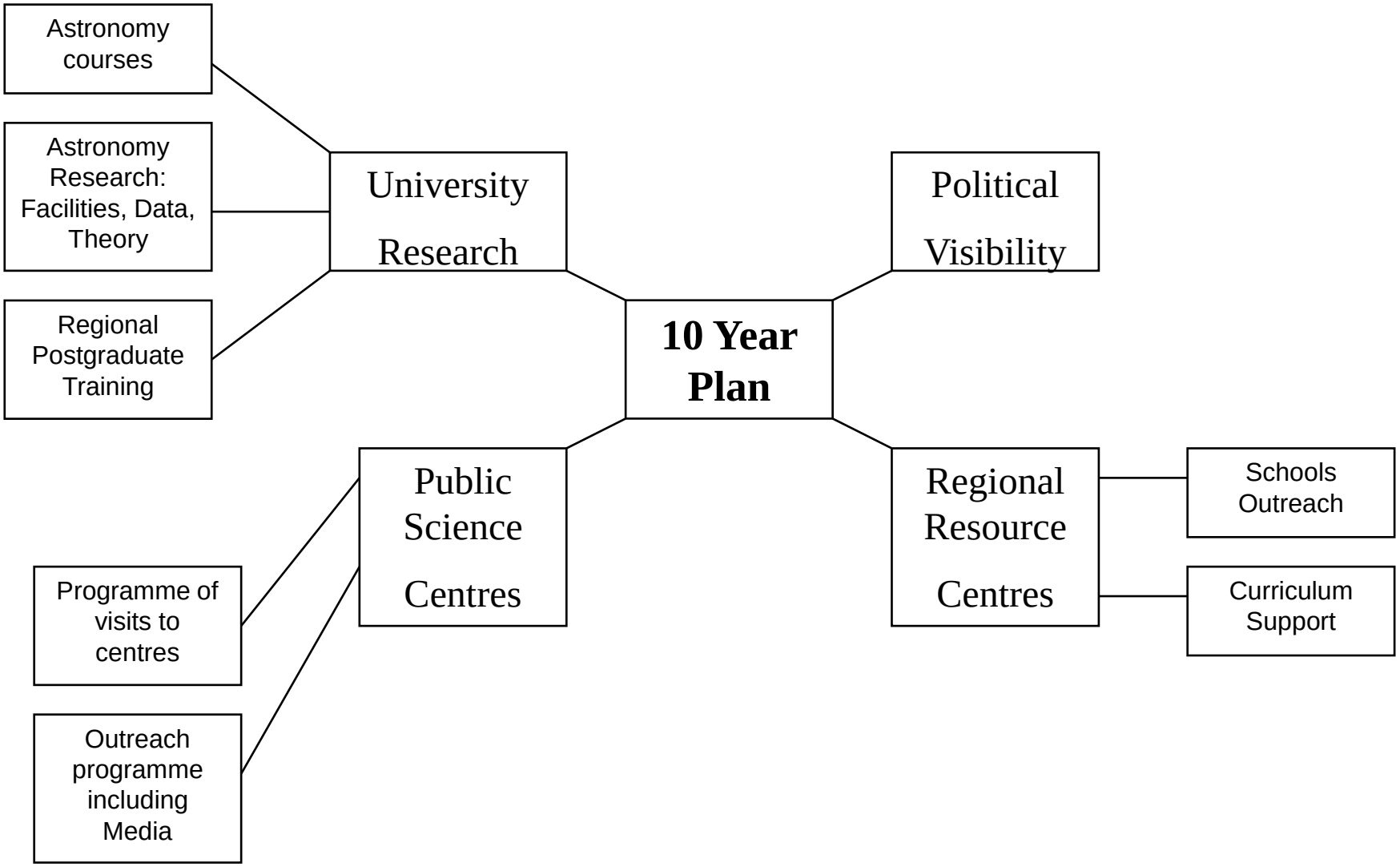


A Plan for Africa

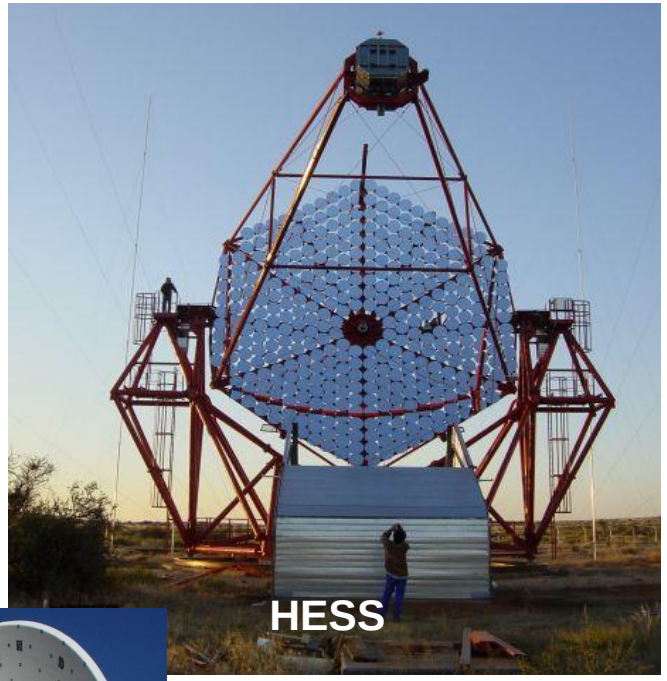


Core Missions

- Enhance the teaching and interest in Maths and Science in **schools**
- Enhance the teaching and research in astronomy in **universities**
- Increase the awareness and knowledge of science amongst the **public**
- Support and encourage an **African network**


Astronomy courses
Astronomy Research: Facilities, Data, Theory
Regional Postgraduate Training
University Research
Political Visibility
10 Year Plan
Public Science Centres
Programme of visits to centres
Outreach programme including Media
Regional Resource Centres
Schools Outreach
Curriculum Support

African Facilities



White Paper on Science and Technology 1996

**"Scientific endeavour is not purely utilitarian in its objectives and has important associated cultural and social values …
Not to offer 'flagship' sciences (such as physics and astronomy) would be to take a negative view of our future - the view that we are a second class nation, chained forever to the treadmill of feeding and clothing ourselves."**

science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

REPUBLIC OF SOUTH AFRICA

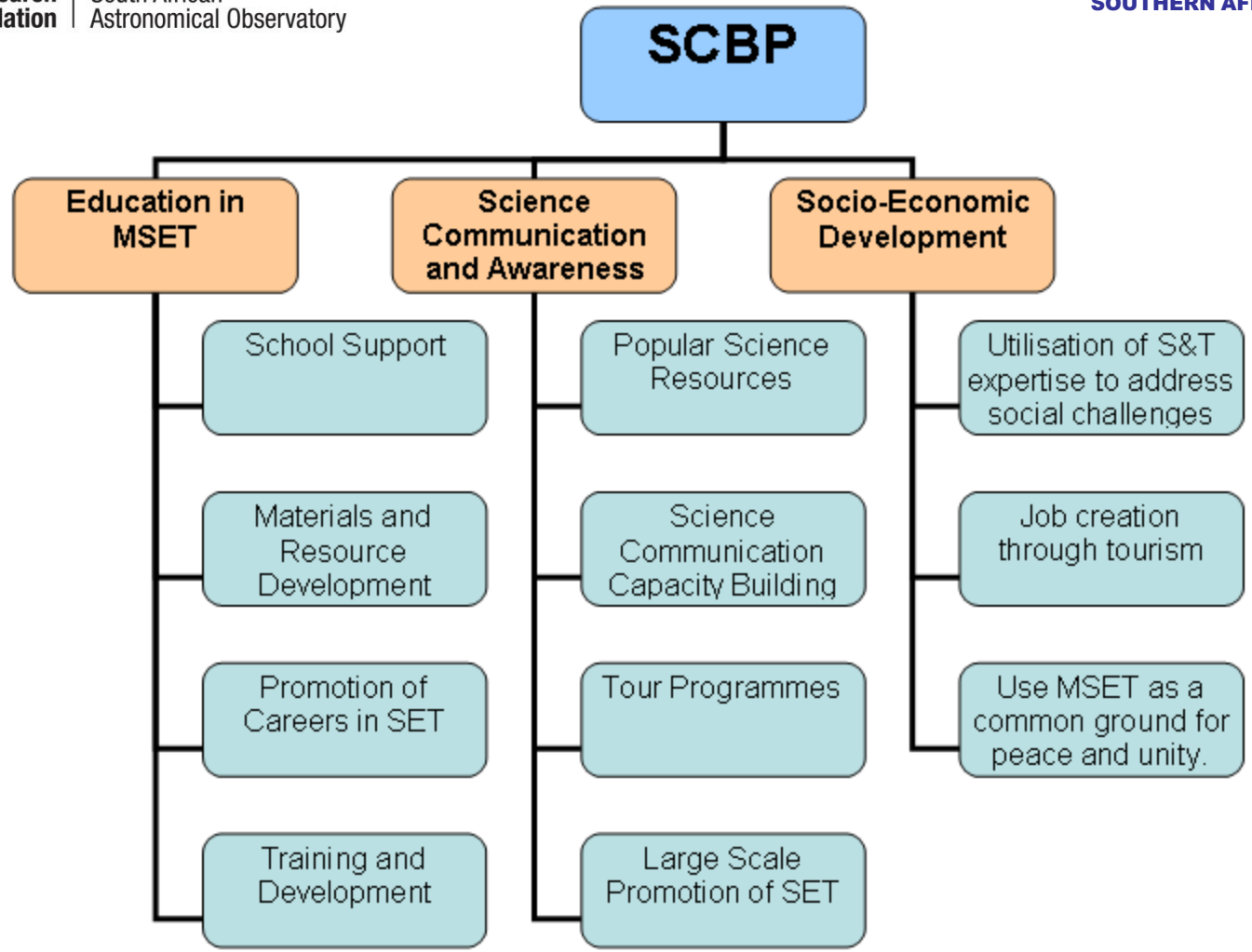
ASTRONOMY GEOGRAPHIC ADVANTAGE BILL

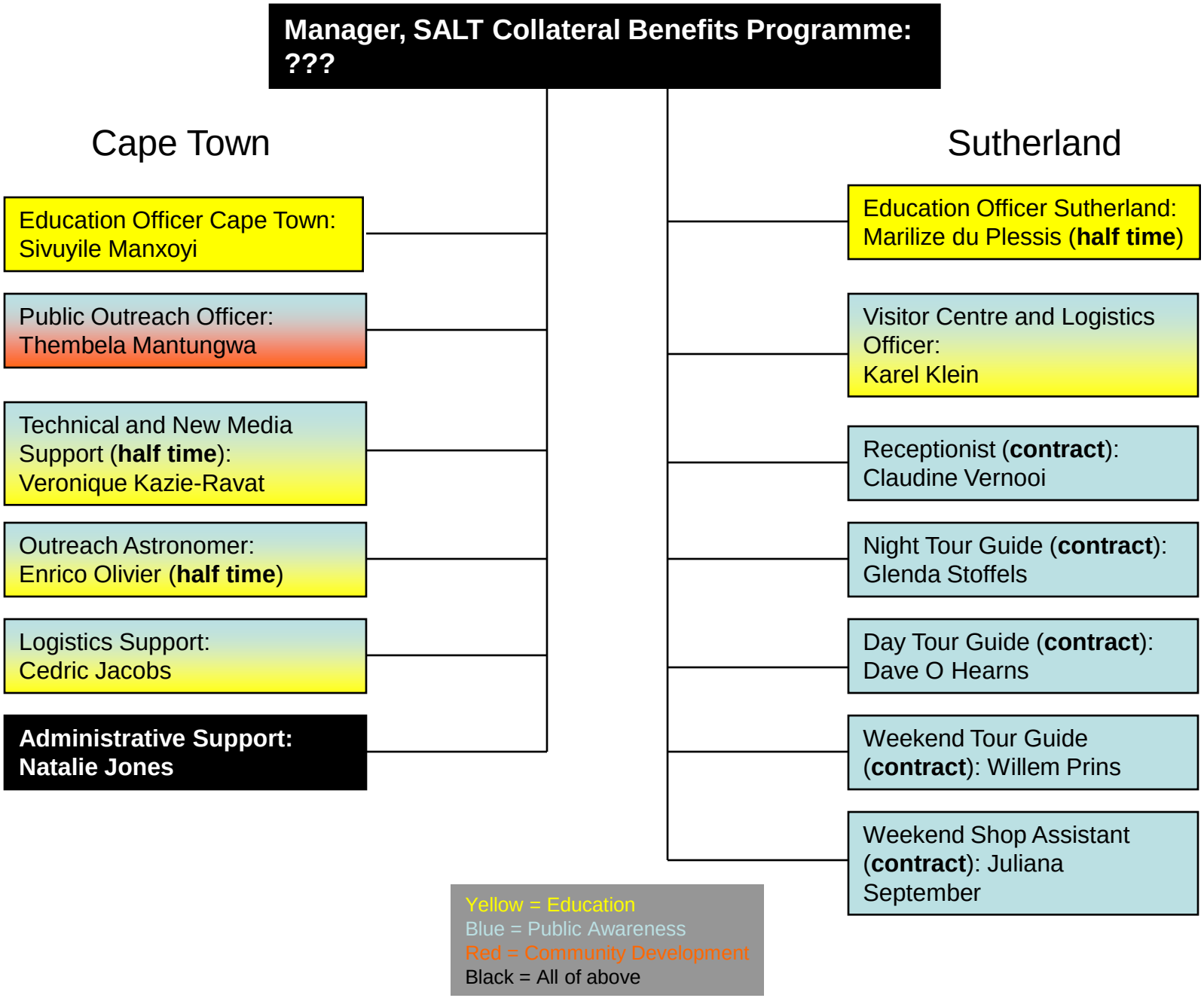
(As introduced in the National Assembly (proposed section 75);
Bill published in Government Gazette No. 29897 of 25 May 2007)
(The English text is the official text of the Bill)

(MINISTER OF SCIENCE AND TECHNOLOGY)

SALT Collateral Benefits Programme (original)

- SALT industrial empowerment
- SALT educational empowerment
- Public outreach and direct educational benefits
- Science education visitor centres
- SALT as an African facility


SCBP
Education in MSET
Science Communication and Awareness
Socio-Economic Development
School Support
Materials and Resource Development
Promotion of Careers in SET
Training and Development
Popular Science Resources
Science Communication Capacity Building
Tour Programmes
Large Scale Promotion of SET
Utilisation of S&T expertise to address social challenges
Job creation through tourism
Use MSET as a common ground for peace and unity.


Manager, SALT Collateral Benefits Programme: ???
Cape Town
Education Officer Cape Town: Sivuyile Manxoyi
Public Outreach Officer: Thembela Mantungwa
Technical and New Media Support (half time): Veronique Kazie-Ravat
Outreach Astronomer: Enrico Olivier (half time)
Logistics Support: Cedric Jacobs
Administrative Support: Natalie Jones
Sutherland
Education Officer Sutherland: Marilize du Plessis (half time)
Visitor Centre and Logistics Officer: Karel Klein
Receptionist (contract): Claudine Vernooi
Night Tour Guide (contract): Glenda Stoffels
Day Tour Guide (contract): Dave O Hearns
Weekend Tour Guide (contract): Willem Prins
Weekend Shop Assistant (contract): Juliana September
Yellow = Education
Blue = Public Awareness
Red = Community Development
Black = All of above

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Education

SOUTHERN AFRICAN LARGE TELESCOPE

- Sutherland schools extra classes
- Chemical cleanup
- Science shows and workshops in Karoo Hoogland
- Science centre in Sutherland
- Exhibitions on loan at SAAO
- National Science Week
- Sasol TechnoX (winning workshop)
- Library project
- World Space Week
- Educator workshops (UCT, US, UWC)
- After school learning facility in Sutherland
- Astronomy Quiz (winners in both provinces; finals at SAAO)
- NRF Western Cape collaboration
- SAIP and SASA conferences

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SOUTHERN AFRICAN LARGE TELESCOPE

Public Awareness

- Williston, Fraserburg festivals
- Sutherland science centre for public
- Sutherland development centre
- IAU OAD publicity
- SKA Undergrad programme
- SKA Forum – UNAWE outreach – SA, Australia, Netherlands
- Langa Astronomy Project
- Franschoek outdoor festival
- Namibian Science Week
- BBC visit to SAAO
- SAASTEC Board – Science Centre Accreditation
- AMNH input into visitor facilities

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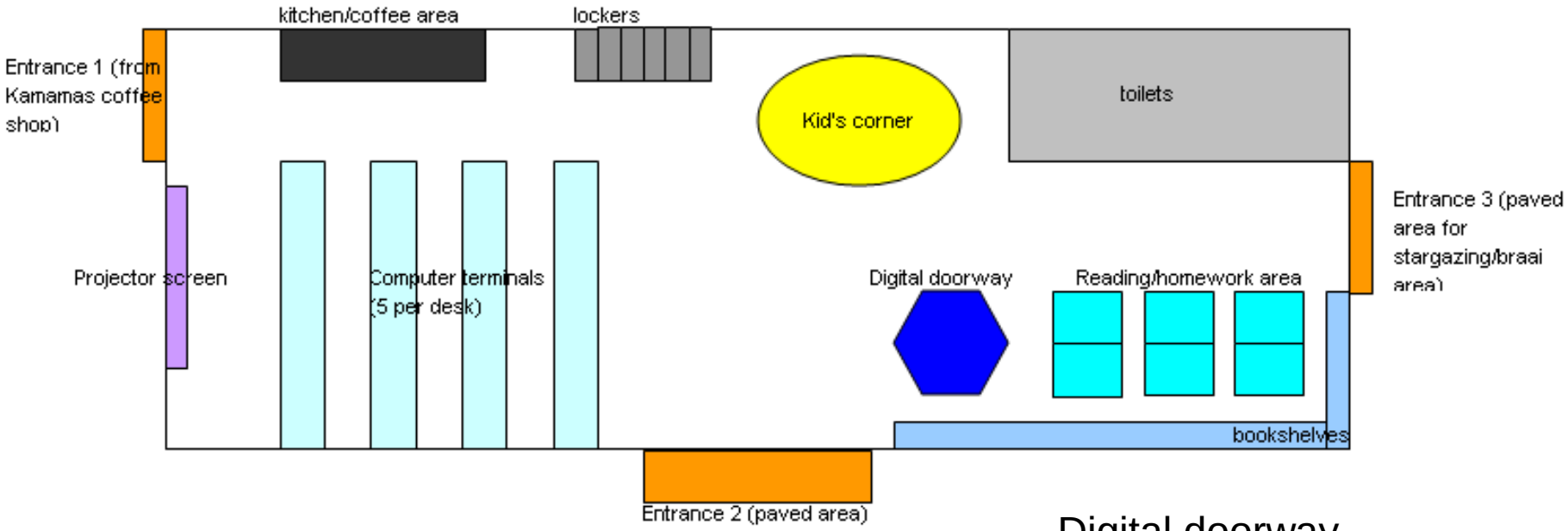
SOUTHERN AFRICAN LARGE TELESCOPE

Socio-Economic Development

- Williston and Fraserburg festivals
- Sutherland Heritage day festival
- Sutherland drug and alcohol awareness programme
- Inter-governmental forum
- KHM tourism route launched
- Sutherland Reflections (Art meets Science)
- Tech ops development plan
- “Science, Technology and Community development centre” in Sutherland –
  - jobs surrounding the centre;
  - establishment of Management Board;
  - MOA signed;
  - construction underway;
  - public meetings

Science, Technology and Community development centre (floor space: 20m x 6m)



-Digital doorway
-After school centre
-Wireless mesh
-Interns
-Training during construction
-Usage by SAAO/SALT staff
-Management board

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International Activities

SOUTHERN AFRICAN LARGE TELESCOPE

- **Africa**
  - Seed Grants
  - Telescope donations for Africa – arrived in SA
  - Algerian group to SAAO
  - Regional development workshop - Kenya
  - African Astronomical Society
  - Ethiopian workshop

- **Globally**
  - Beyond IYA Exec Committee Working Group
  - IAU Commission 46 (WWDA, TAD, NASE)
  - IYA2009 “Developing Astronomy Globally”
  - Seed grants (Macedonia, Nepal, Uganda, Mongolia, Nicaragua, Nigeria, Kenya, Ethiopia, Gabon, Rwanda, Uruguay, Tajikistan)
  - Global Telescope Donations
  - IAU Office for Astronomy Development

Developing Astronomy Globally

INTERNATIONAL YEAR OF ASTRONOMY 2009
CORNERSTONE PROJECT

THE UNIVERSE
YOURS TO DISCOVER

INTERNATIONAL YEAR OF ASTRONOMY 2009

www.developingastronomy.org

Global Cornerstone Projects

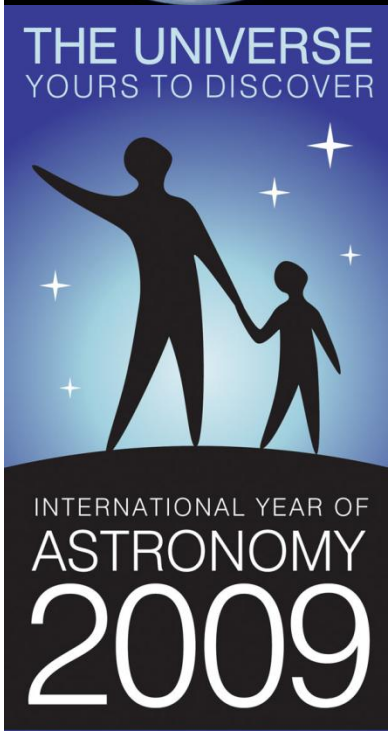
1. 100 Hours of Astronomy
2. The Galileoscope
3. Cosmic Diary
4. The Portal to the Universe
5. She is an Astronomer
6. Dark Skies Awareness
7. Astro&World Heritage
8. Galileo Teacher Training Prog.
9. Universe Awareness
10. From Earth to the Universe
11. Developing Astronomy Globally

Developing Astronomy Globally

Goals

- **Use the momentum of IYA to stimulate the establishment and enhancement of regional structures/networks around the world that would focus on the development of astronomy.**

- **Ensure sufficient reach and benefit of IYA and other cornerstones to developing regions.**



Astronomy in Africa Survey

- **Professional**

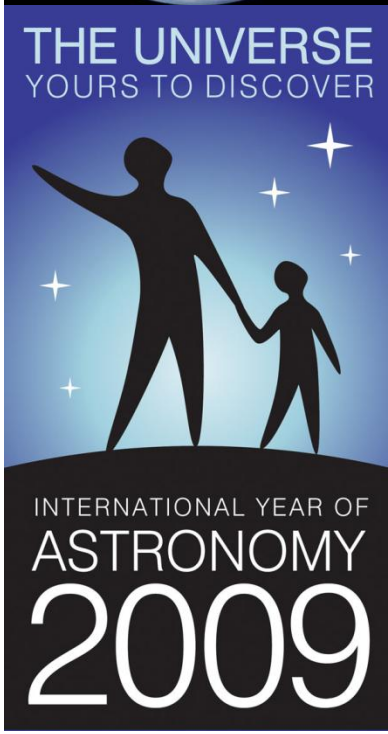
Universities,
Academics,
Astronomical Facilities

- **Public**

Outreach programmes,
Astronomy in media,
Astronomy and science in general culture

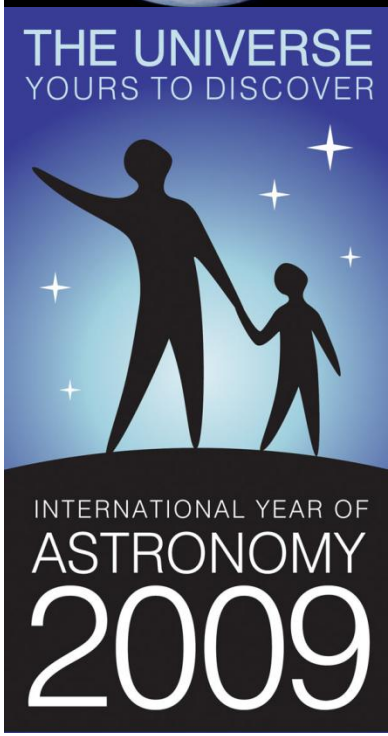
- **Schools**

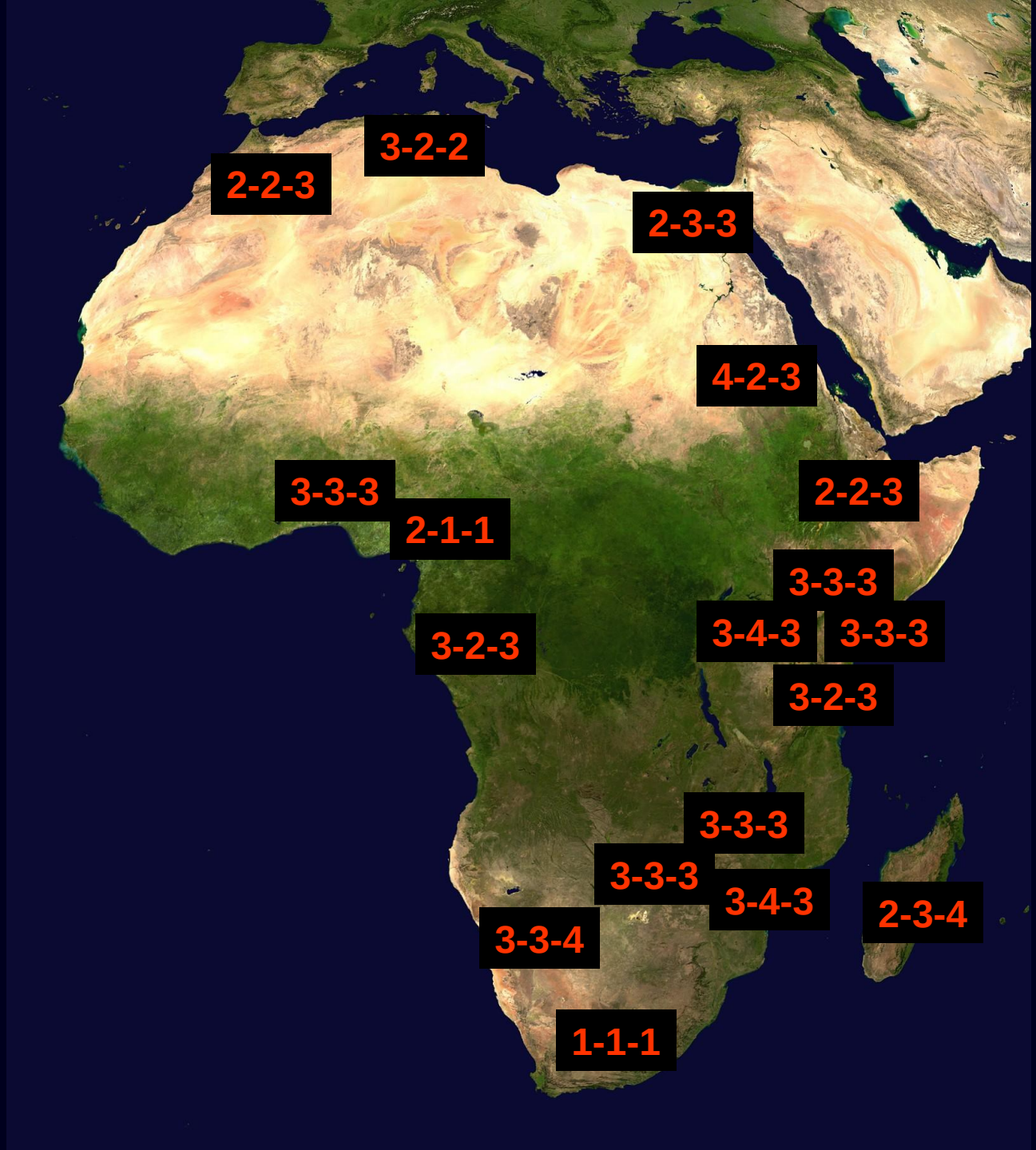
Education programmes,
Astronomy in classroom,
Maths and science challenges



Astronomy in Africa Survey

		professional	public	schools
1	South Africa	1	1	1
2	Morocco	2	2	3
3	Tunisia	3	2	2
4	Egypt	2	3	3
5	Sudan	4	2	3
6	Nigeria	2	1	1
7	Ghana	3	3	3
8	Ethiopia	2	2	3
9	Gabon	3	2	3
10	Uganda	3	3	3
11	Kenya	3	3	3
12	Rwanda	3	4	3
13	Tanzania	3	2	3
14	Zambia	3	3	3
15	Malawi	3	3	3
16	Mozambique	3	4	3
17	Namibia	3	3	4
18	Madagascar	2	3	4




3-2-2
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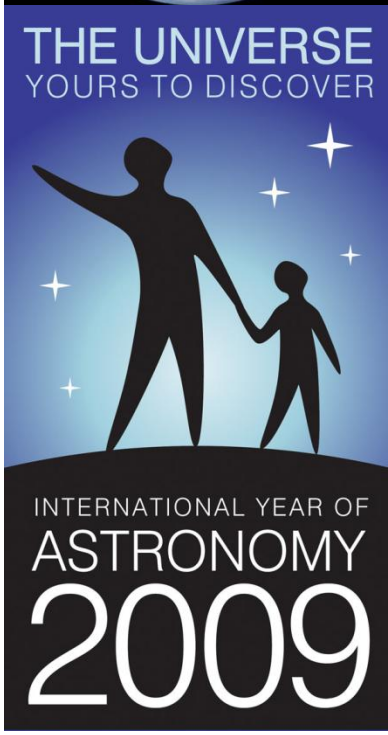
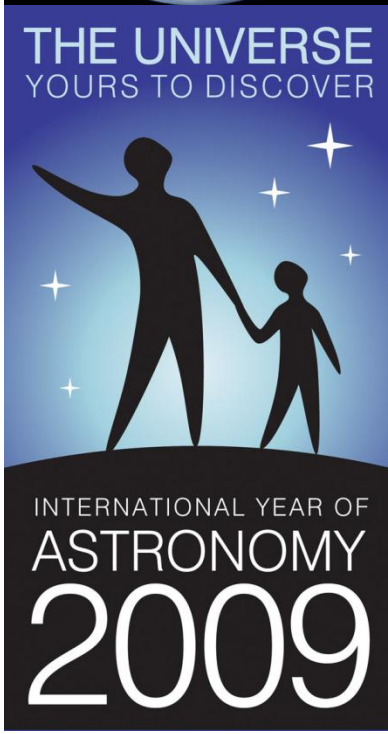
3-4-3
3-3-3
3-2-3
3-3-3
3-3-3
3-4-3
2-3-4
3-3-4
1-1-1

Grants Summary Table

Country	Summary of proposal
Rwanda	distribute galileoscopes to 5 schools and education department; outreach; conferences for the schools; aim to stimulate astronomy in Rwanda
Kenya	buy telescopes and travel; astronomy outreach and gathering information on indigenous astronomy; university of nairobi
Macedonia	Astronomy caravan; outreach with lectures and stargazing; run by astronomy club
Nepal	teacher training; student training; observation; posters; outreach to 5 locations; submitted by lecturer and SPOC
Uganda	schools outreach; schools conference; general public talks and outreach
Tajikistan	travelling astronomy lectures and viewing; submitted by institute of astronomy
Mongolia	workshop on developing astronomy in mongolia targeted at researchers, amateurs, governments, herders
Uruguay	distribute galileoscopes to schools
Ethiopia	expand existing programme for universities to 3 new universities (outreach, workshops, stargazing)
Nigeria	outreach in the form of workshops for schools
Gabon	outreach at big IYA event with telescopes, projector
Nicaragua	teacher training sessions for 3 days



Astronomical Societies



- **East African Astronomical Society**
- **African Astronomical Society**
- **West African Astronomical Society??**
- **Others?**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OPTICS
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MATHE-MATICS
ABSTRACT THOUGHT
CHEMISTRY
PRODUCING ORGANIC MOLECULES
BIOLOGY
BUILDING BLOCKS OF LIFE
SCIENCE AND RESEARCH
IAU

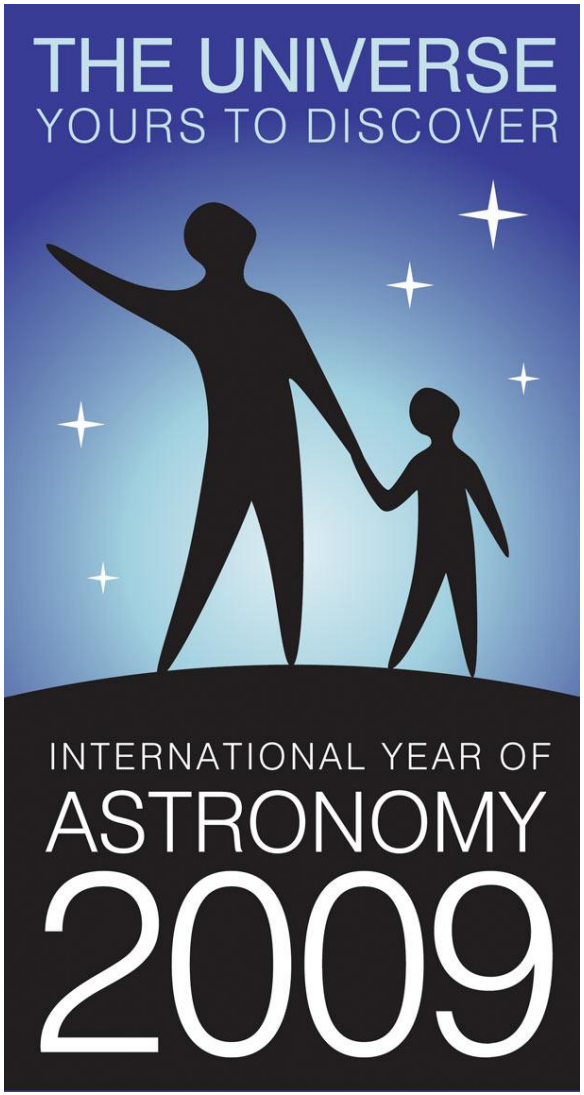
Who is the IAU ?

- Founded in 1919
- To promote and safeguard the science of astronomy in all its aspects through international cooperation
- Structured in Divisions, Commissions, Working groups and Program Groups
- Mainly professional astronomers from all over the world
- 10120 Individual Members in 90 countries worldwide

Who is the ΨΑU ?

/www.thinkaerospace.com

Who is the IAU ?



National Nodes: 148

Organisational Nodes: 40

Organisational Associates:33

National Websites: 111

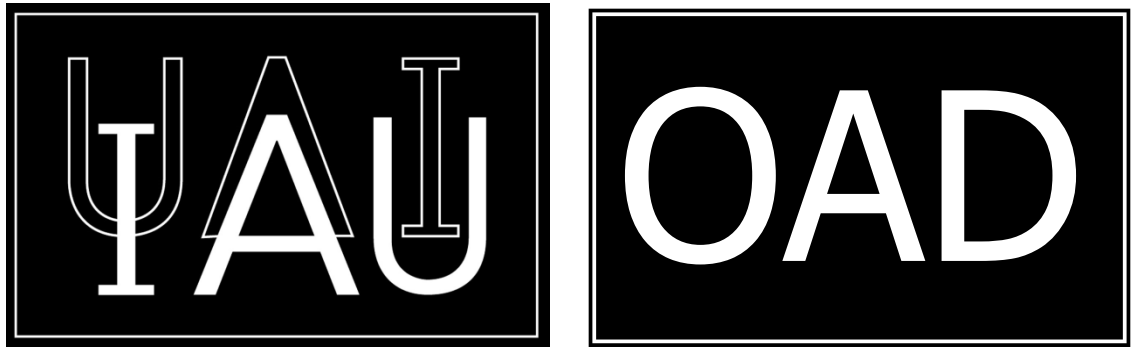
Cornerstone Projects: 12

Special Task Groups: 11

Special Projects:16

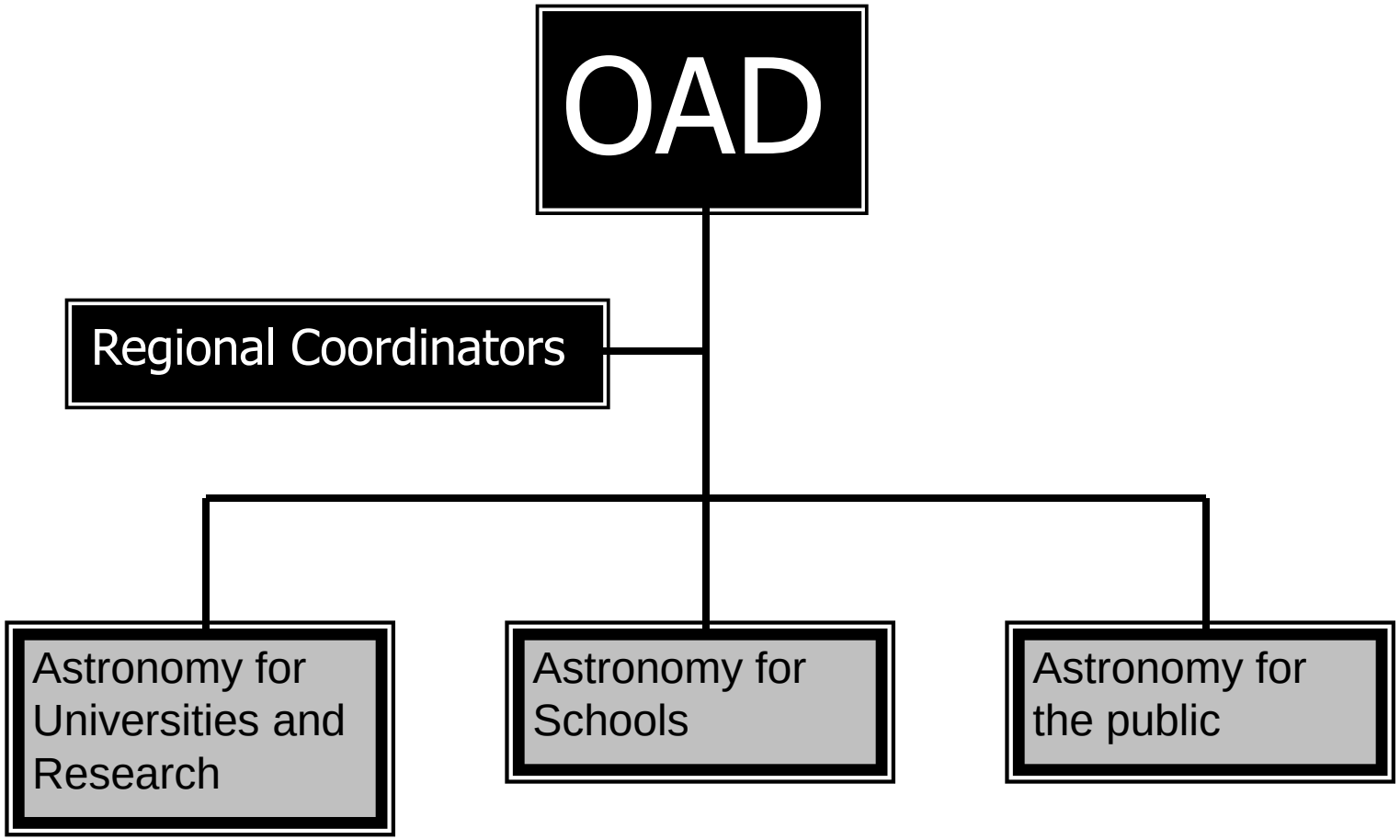
Official Products:8

Media Partners:22



~~Office for Astronomy Development~~

Office of Astronomy for Development?


OAD
Regional Coordinators
Astronomy for Universities and Research
Astronomy for Schools
Astronomy for the public

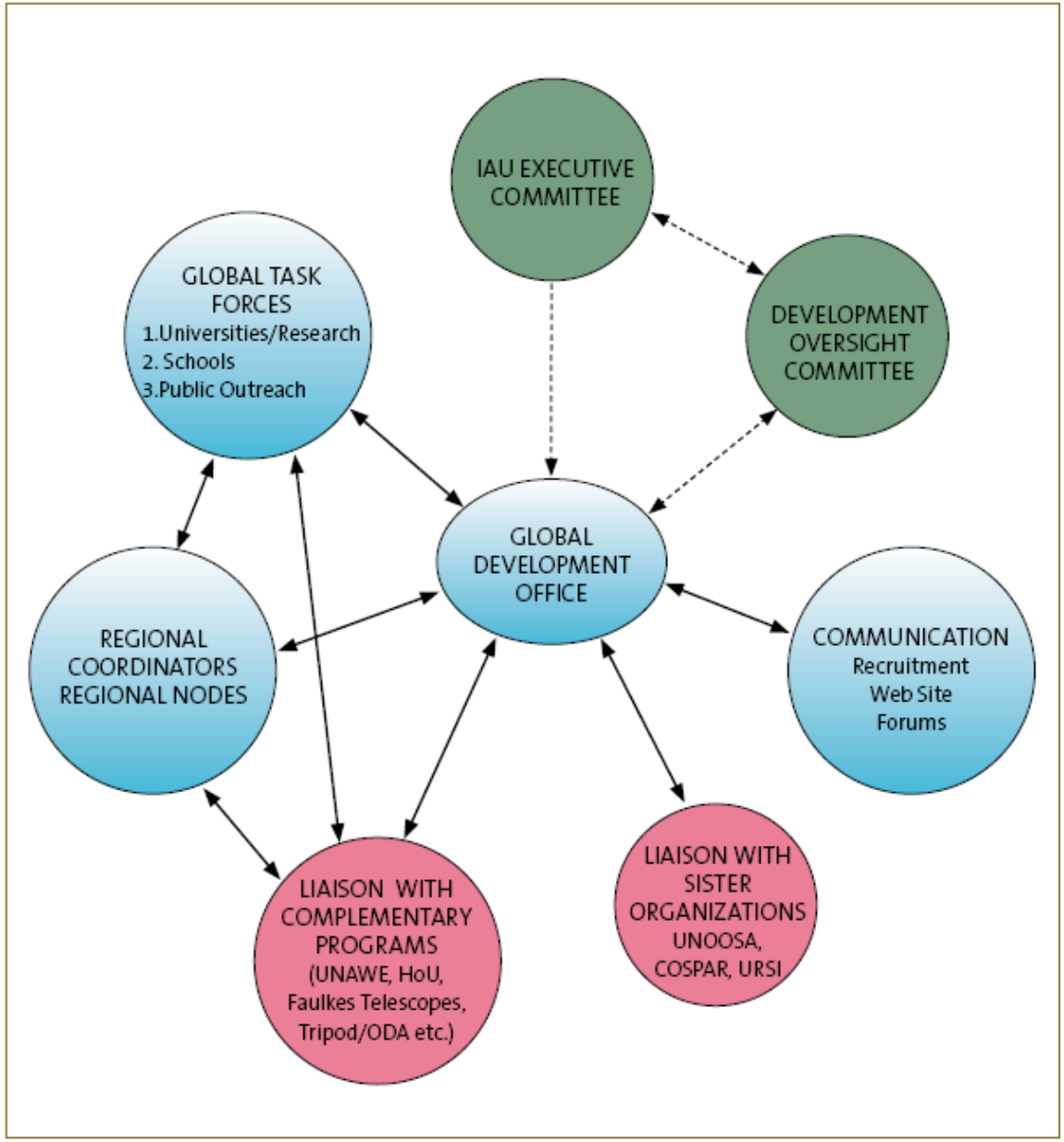


Figure 23

FUNCTION OF THE GLOBAL DEVELOPMENT OFFICE

Schematic diagram showing the relationship of the Global Development Office to the various structures and activities described in this plan.

Selecting a host country for the OAD…

- **Announcement of Opportunity**
- **Expressions of Interest (40)**
- **Invited calls for proposals (20)**
- **Proposals evaluated by IAU Executive Committee**
- **Announcement of selected host**
- **Negotiations**
- **Agreement signing**

Why South Africa?

- Vision in Science and Technology
- Strong astronomy community
- Well established observatory
- Strong outreach community
- Sub-Saharan Africa – focus area
- Track record of development activities
- Bridge for “North-South” collaborations
- Good governmental support

So what's the big deal?

- South Africa
- Africa
- World

The plan…

- tba?

Year 1:
- Establish OAD and appoint Director (who will then appoint other staff)
- Basic evaluation of and involvement in existing IAU programmes
- Negotiations for the establishment of regional development offices worldwide
- Marketing of the newly established OAD to relevant international bodies
- Fundraising for astronomy development activities
- Establishment and maintenance of IAU website for development
- Communicate with IAU members regarding development programmes

Year 2:
- Detailed evaluation of existing IAU programmes
- Selection and optimisation of effective development programmes, including endowed lectureship programme and others mentioned in strategic plan
- Establishment of regional development offices and coordinators
- Fundraising for astronomy development activities
- Establish database for astronomy materials and resources
- Host first international workshop on astronomy development

Year 3:
- Help raise funds and resources for regional development activities and coordinators
- Continued coordination of IAU development programmes including management of pools of volunteers and resources for IAU activities
- Monitoring and evaluation of IAU programmes
- Expand resources database and distribute to regional coordinators
- Training and development for regional coordinators
- Reporting and marketing of the OAD's "first 3 years"