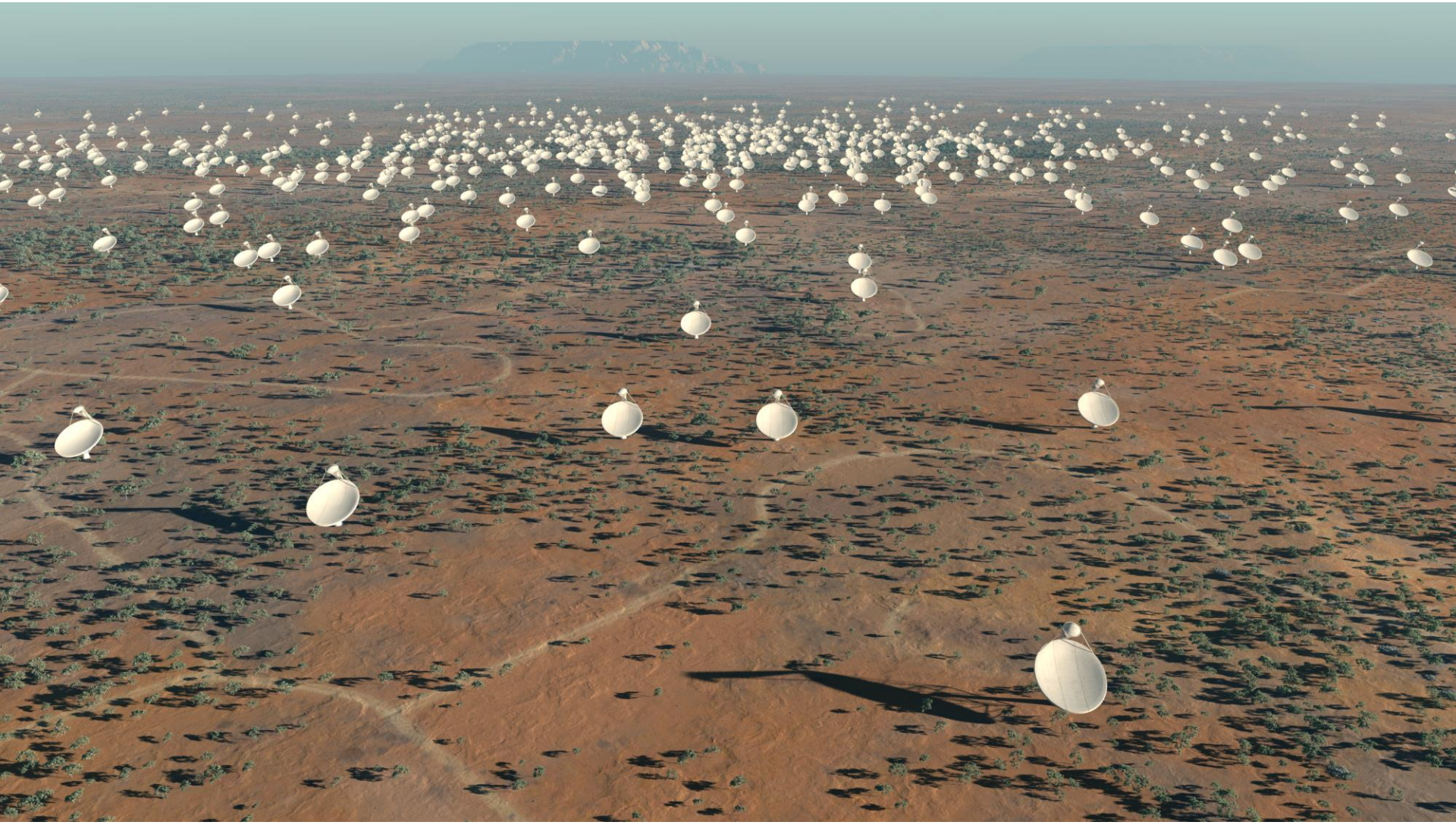
GO-SKA

A proposal for coordinating & supporting policy development of the global organisation of the Square Kilometre Array

(GA No. 283632, INFRA-2011-3.2.)

Max-Planck-Institut für Radioastronomie



The Square Kilometre Array (SKA)

- A global science, technology and innovation project
- Build in Southern Africa and Australia
- The largest observatory on Earth: a radio telescope with a collecting area of about 1 square kilometre
- Thousands of receptors will extend to distances of 3 000 km from the central regions.
- The SKA will address fundamental unanswered questions about our Universe:
  - How the first stars and galaxies formed after the big bang,
  - How dark energy is accelerating the expansion of the Universe,
  - The role of magnetism in the cosmos,
  - The nature of gravity, and
  - The search for life beyond Earth

The Square Kilometre Array (SKA)

- Innovation potential:
  - Information- and Communication Technology: Computing instead of conventional steel telescopes
  - Big data: Exaflop computing
  - Solar energy and energy storage: Enormous energy demand in remote areas without direct access to the grid ⇔ but in the sunniest zones of the world (challenge: 24h/7d)
  - Electronic engineering (receivers)

- There are a lot of superlatives...

Did you know?

- The data collected by the SKA in a single day would take nearly two million years to playback on an ipod.
- The SKA central computer will have the processing power of about one hundred million PCs.
- The SKA will use enough optical fibre to wrap twice around the Earth!
- The dishes of the SKA will produce 10 times the global internet traffic.
- The aperture arrays in the SKA could produce more than 100 times the global internet traffic.
- The SKA will generate enough raw data to fill 15 million 64 GB iPods every day!
- The SKA supercomputer will perform 10^{18} operations per second – equivalent to the number of stars in three million Milky Way galaxies – in order to process all the data that the SKA will produce.
- The SKA will be so sensitive that it will be able to detect an airport radar on a planet 50 light years away.
- The SKA will contain thousands of antennas with a combined collecting area of about one square kilometre (that's 1 000 000 square metres!).

(http://www.skatelescope.org)

GO-SKA work packages

- **WP1: Management**

  Leader: *Patricia Vogel (NWO, NL), co-leader Simon Berry (STFC)* ***Staff NWO:*** *Maaike Damen, André van Es, Liesbeth Gerritsen (secretariat), Shuk-Hing Alma-Hau (financial department)*

- **WP2: Building a globally coordinated collaboration for SKA**

  broaden and strengthen involvement around the globe

  Leader*: Simon Berry (STFC, UK),* ***Staff:*** *Michelle Cooper, Simon Haynes*

- **WP3: Global governance of the SKA project**

  develop and implement global governance

  Leader: *Patricia Vogel (NWO),* ***Staff:*** *Maaike Damen, Miriam Roelofs*

- **WP4: Industry engagement for the SKA project**

  develop a global approach to industry engagement

  Leader *: Corrado Perna (INAF, IT),* ***Staff:*** *TBD*

- **WP5: Developing the SKA as a tool to address global challenges**

  develop a plan to maximise socio-economic benefits

  Leader *: Michael Kramer (MPG, GE),* ***Staff:*** *Viola Tegethoff, Yingzheng Li, Reinhard Keller, Anton Zensus*

Aims & Objectives

Work Package 5 will

- Build a core group of science, industry and government stakeholders representing the main innovation drivers of the SKA as a strategic forum
- Identify the global challenges and define conditions by which non-scientific benefits from large scale research infrastructures can best be integrated into investment decision-making
- Enhance global and trans-cultural collaboration in communicating the advancement of knowledge for the benefit of mankind.
- Prepare recommendations for the SKAO-Board of Directors

SKA & Global Challenges

Science and Technology

Sustainable development and Climate Change

Energy

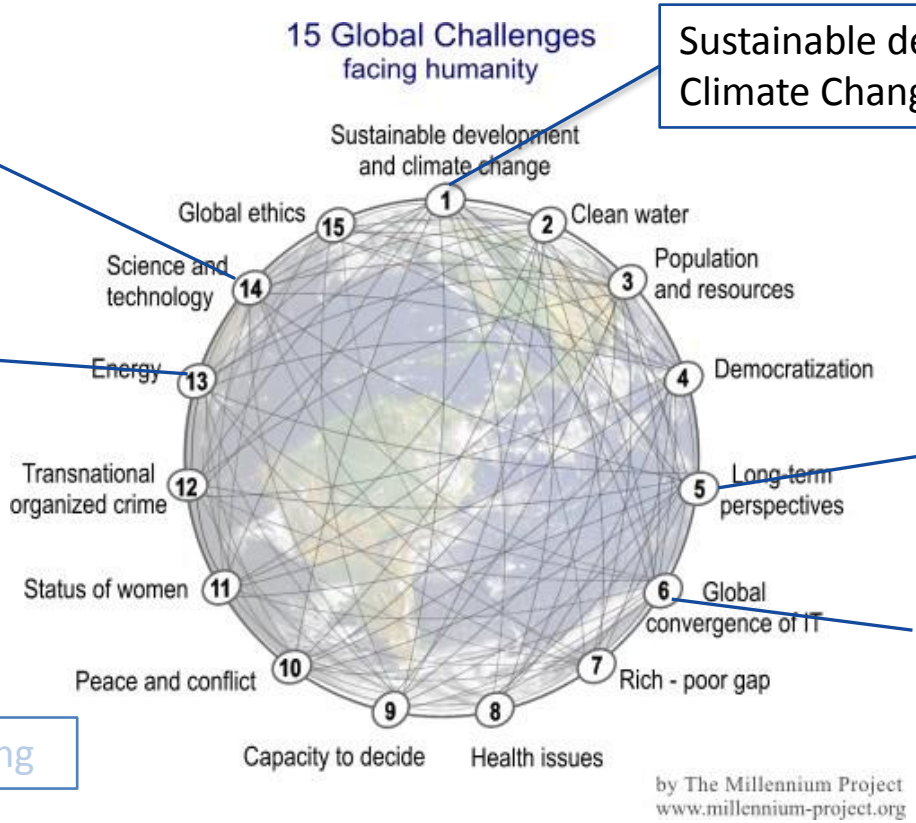
Long-term perspectives

Status of women

Global convergence of IT

Capacity building

Health issues



Examples for prime targets

- **Energy:** Less industrial component (e.g. PV companies), but more political component ("Green Astronomy", social-conscious MEGA Science – "cannot destroy planet for understanding cosmos!")

- **Electronics & ICT**: "Green High-Performance Computing (HPC)" but also being "customers" for existing HPC initiatives and programs (e.g. PRACE in Europe) as one example for collaboration across ESFRI project; Involving commodity component partners (NVDIA, Playstation etc.) as potential partner in solving HPC problem; Citizen Science;

- **Training & Education**: Capacity building; Next generation of scientists and engineers; close collaboration with Universities, schools, etc; involving students at early age; collaboration with popular science magazines etc.

Overall plan for WP5

- Develop a strategy to include the main global challenges in the decision-making process;
- Broaden the global consortium for the SKA project with partners that are experts on these high-impact fields;
- Advice for the development of a business case for the SKA-1 on the return on investment in SKA-1 construction and operations to Governments and research agencies.
- Seek “non-traditional” funding for the SKA
- Establish routes and enable transfer of knowledge and experience to and from other global scale research projects.

Focus Group

- Should consist of ca. 10 high-level members.
- Will meet two or three times in 2013 and 2014.
- The members should be stake-holders of different societal groups and / or organisations, such as
  - Private foundations (e.g. European Foundation Centre; Jacobs Foundation, Hasselblatt-Foundation)
  - Founding organisations (ESF, national & regional agencies)
  - International and European Organisations (UNESCO, OECD, European Commission)
  - Policy Makers (members of parliament)
  - Industry representatives
  - Experts “Science”
  - Expert „Promoting Science to General Public“

Thank you for your attention!