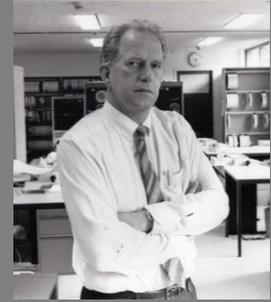


Wim and the SKA

Richard Schilizzi

WimSym77, Dwingeloo

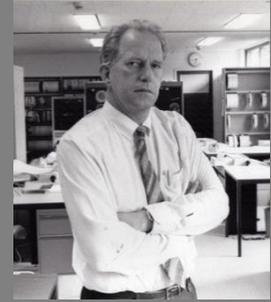
7 July 2017



The Sterrewacht in 1976

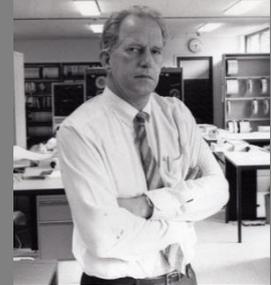
- Sterrewacht atmosphere was dynamic, most of the staff were young including Wim
- a place where astronomy and engineering met
- Morning coffee
- Mostly engineers and technicians and a few liaison astronomers Dan Harris, Richard Strom, Ger de Bruyn and me
- VLBI with Arnold and Jean
- Wim and Ron suggested I write a report on VLBI
→ ITR 55 “On VLBI in Europe”

Wim and the international SKA



- Member of the ISSC (Oct 1999 – Dec 2006)
- ISSC Secretary and member of ISSC Executive Committee
Sep 2003- Dec 2006
- ISSC at-large member Oct 2007
- Member of Site Evaluation and Selection Committee 2003 -4
Vice-chair of the Site Evaluation WG 2005-2006
- Member of the SKA Site Advisory Committee 2011-2012

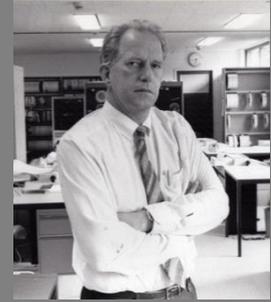
International SKA Steering Committee



MOU signed IAU Manchester August 2000



Wim in the ISSC



- Member for Australia from 1999 to 2004
- Reported on progress in Australia (shared with Ron Ekers)
- Led discussion on internal structure of the ISSC and membership
- Was person most familiar with ISSC MoU articles
- Set out scope of Software Engineering team
- Kilometre vs Kilometer
- As Secretary, Wim created wonderfully complete minutes of the 10 full ISSC meetings and 40 monthly Exec meetings. They provide an unmissable blow-by-blow history of the meetings

Square Kilometre Array

3 sites; 2 telescopes + HQ
1 Observatory

Design Phase: ~€200M; 600 scientists+engineers

Phase 1

Dish array in South Africa, Low frequency array in Australia

Construction: 2019 – 2024

Construction cost: €674M (inflation-adjusted cost cap)

Operations cost: ~€90M/yr

Observatory Development Programme (€20M/year planned)

Phase 2

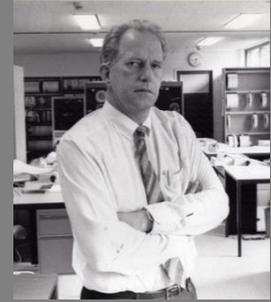
Start mid-2020s (AIP now)

Multi-billion Euro project

~2000 dishes across 3500km of Southern Africa

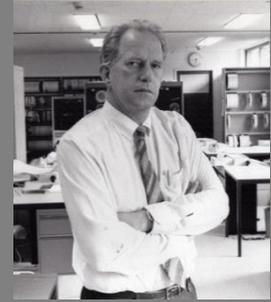
Major expansion of SKA1-Low across Western Australia

Key decisions that changed the course of the SKA Project



- [1990 Noordam-Wilkinson interaction at IAU131 → the Hydrogen Array presentation]
- 1993 URSI Large Telescope WG formed, start of SKA
- 2004 ISSC decision to stage SKA construction as Phase 1, 2, and 3
- 2005 Technology down-select → Reference Design
- 2006 Funding Agency decision to require a site shortlist, negotiations, and “blood on the floor”
 - 2006 ISSC decision on site shortlist: Australia+NZ and Southern Africa
- 2007 Decisions by Australia and South Africa to build ASKAP and MeerKAT as “SKA Pathfinders” on their respective proposed sites
- 2007 ISPO HQ competition → Manchester selected
- 2011 US Decadal Review outcome → US withdrawal from the global SKA project
- 2012 site selection decision → dual site

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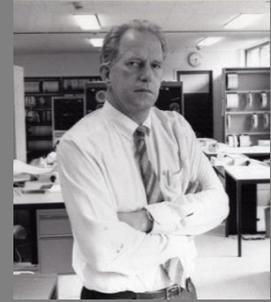
2012 site selection decision → dual site

10 year site selection process

I. 2002-2005

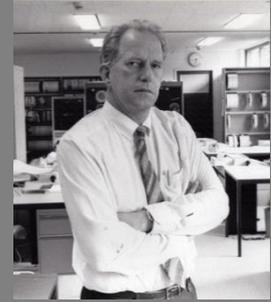


- 2002** Open request to global radio astronomy community for Expressions of Interest in siting SKA
- 2003** Call by ISSC for Initial Site Analyses from Australia, South Africa, Argentina/Brazil, China, USA
- 2004** Call by ISSC for Proposals to Host the SKA
USA did not respond
- 2005** SEWG (Wim and Yervant Terzian) formulated a rigorous process, selection criteria/weights, and protocols
 - International SKA Site Advisory Committee established
 - RFI measurements at the four competing sites
 - December: proposals submitted

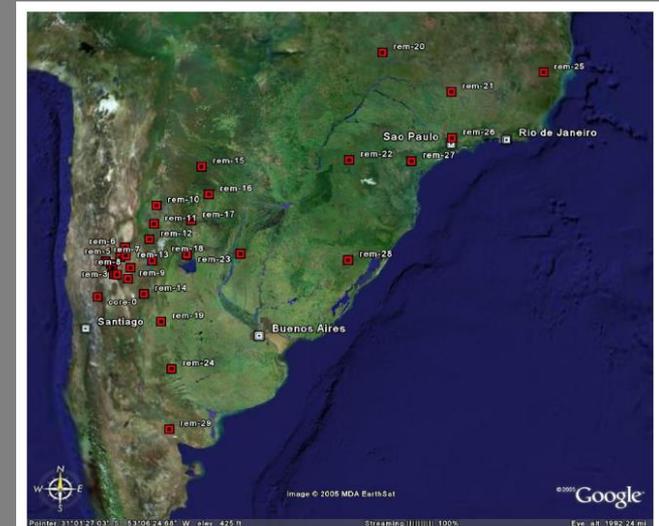
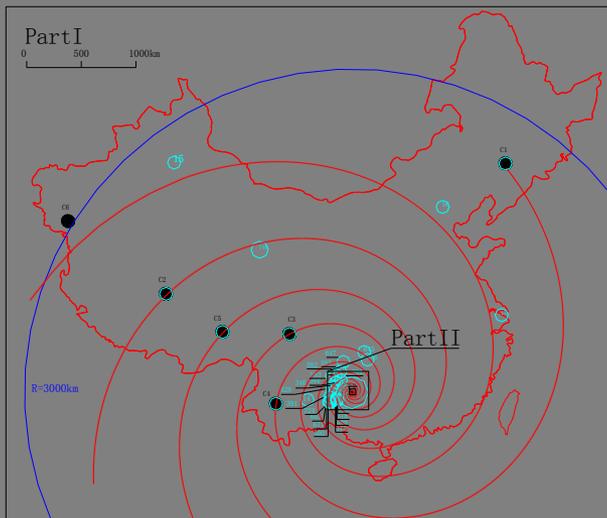
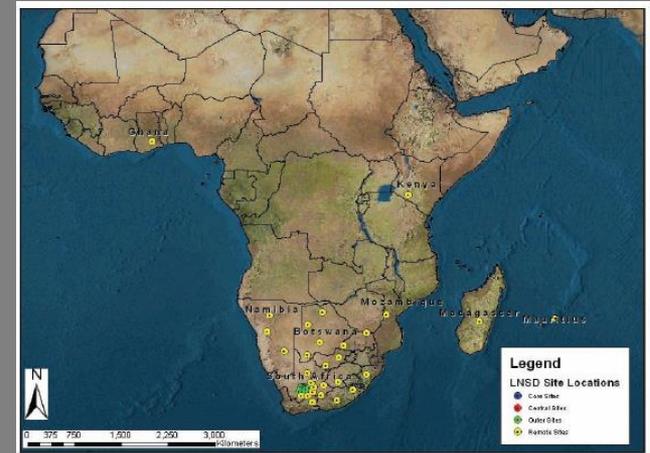
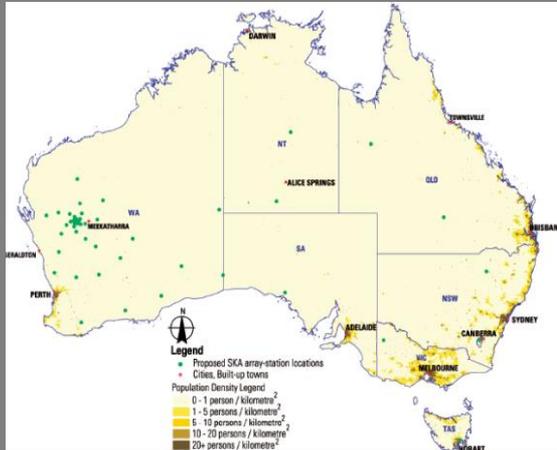


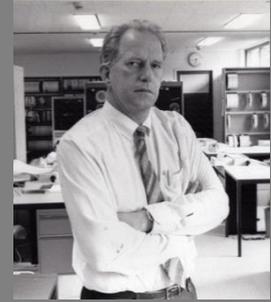
Selection criteria

- RFI
- Array configurations
- Ionospheric effects
- Troposphere
- Climate
- Physical characteristics
- Impact of land use and urban centres
- Existing infrastructure
- Data connections
- Infrastructure costs



The site contenders in 2006





Advice in 2004

Stefan Michalowski

Executive Secretary, OECD Global Science Forum

- Site decisions are the most contentious in international projects
- Unless one site is clearly better than all others, the site decision must be made by the politicians

II. Site selection 2006-2007



Feb 2006 Funding Agencies WG decision to require an unranked site shortlist, negotiations and "blood on the floor"

July ISSAC report ranked Australia+NZ and Southern Africa higher than Argentina/Brazil and China

"Further studies, together with considerations of a wider range of issues, will be needed before any final choice between these two outstandingly good sites can be made."

Aug ISSC shortlists Australia+NZ and Southern Africa

Sep ratified by Funding Agencies

2006-7 Decisions by Australia and South Africa to build ASKAP and MeerKAT as "SKA Pathfinders" on their respective proposed sites



III. Site selection 2008-2011

2008-2011 RFI measurement campaign based on an MoU

2010 Funding Agencies and SKA Science and Engineering Committee establish **SKA Siting Group (SSG)** chair, Vern Pankonin (NSF) to oversee process

selection criteria and weights, protocols

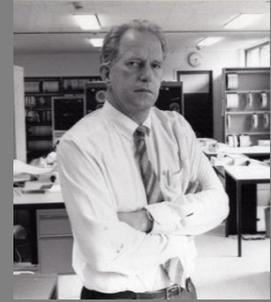
2011 **Request for Information** from the sites, evaluation by expert panels, consultants, SKA Project Office

2011 Establishment of **SKA Site Advisory Committee**

chair Jim Moran, members incl **Wim Brouw**, Jaap Baars, Peter Tindemans, Stefan Michalowski

Throughout the period, the political pressure by AU and RSA ramped up substantially

IV. Site selection 2012



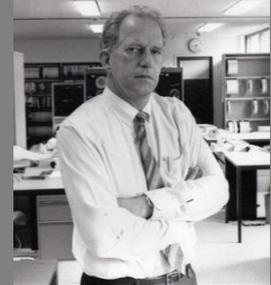
1. 16 February: SSG report and SSAC report submitted to SKAO Board
 - site selection process had been properly followed (SSG)
 - Both sites were acceptable as sites for the SKA, but Southern Africa was preferred (SSAC)

2. 16 February-19 March
 - Comments by Australia + NZ and South Africa

3. 19 March SKAO Board meeting
 - decided not to reopen the work done by the SSAC
 - decision passed to the Members of the Company (as required by the Company articles).

4. 3 April SKAO Members meeting
 - Established a science-based Site Options WG (SOWG) to investigate the feasibility of a dual-site implementation option (or options) building on the relative strengths of the two sites to maximise past investment and potential for future investment.

Site selection 2012



5. 25 May SKAO members meeting

- SOWG recommendation

Full array	Mid-freq dish array	SA
	Low freq AA	ANZ
	Mid freq AA	SA or ANZ
Phase 1	Mid-freq dish array	SA
	Low freq AA	AU
	Survey	AU

- Members adopted SOWG recommendations
- a statement was released to the press, followed by SA and AU statements

SOWG
at work



A difficult
moment

....



Site selection 2012



6. 6-7 October, SKAO Board meeting

- Recommended Members make a formal decision on the dual site solution

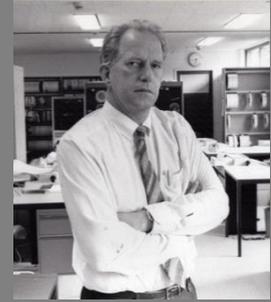
7. 14 November, SKAO members meeting

- Formal decision taken



Points of reflection

- The site competition raised the political profile of the SKA enormously
- The dual site selection has kept all parties on board
- It has allowed local infrastructure to be utilised on both sites, and for SKA1-mid, the incorporation of the 64 MeerKAT antennas
- What effects would a selection of one site in 2006 have had on the project as a whole?
 - Increased focus on SKA design within the community
 - Lower operations costs
 - No risk of two “national” telescopes
 - Reduced engagement of politicians → increased likelihood of slower funding → project delay



Happy Birthday, Wim!