NASSP North

Initial discussion process:

**Nine people representing nine institutions,
plus Charles McGruder as special consultant**

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Adri Burger	**Northwest University – Potchefstroom**
Sergio Colafrancesco	**University of the Witwatersrand**
Chris Engelbrecht	**University of Johannesburg**
Michael Gaylard	**Hartebeesthoek Radio Astronomy Observatory**
Charles McGruder	**Western Kentucky University**
Thebe Medupe	**Northwest University – Mafikeng**
Pieter Meintjes	**University of the Free State**
Derck Smits	**University of South Africa**
Chris Theron	**University of Pretoria**
Caroline Zunckel	**University of Kwazulu-Natal**

Key proposals:

Manage NASSP from an independent office

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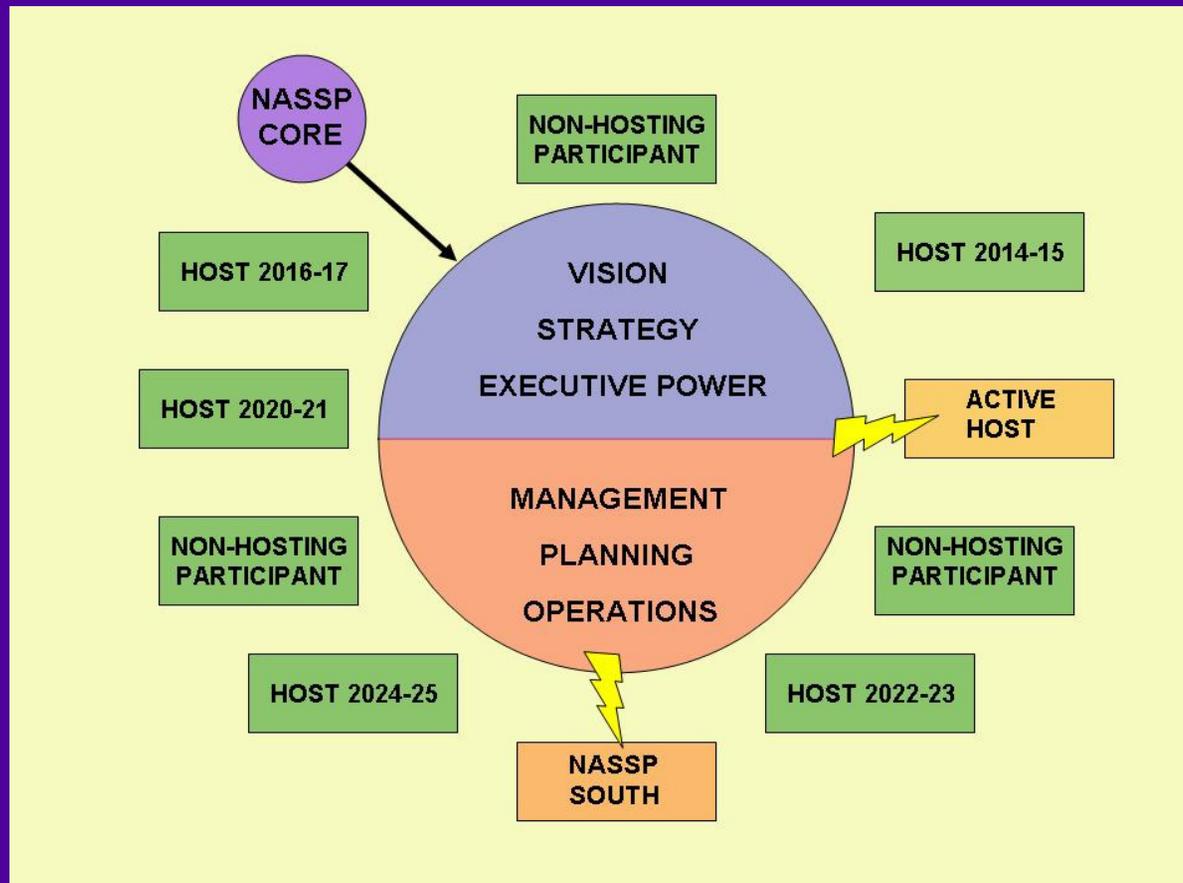**Rotate the hosting venue every 2-3 years**

Key proposals:

Manage NASSP from an independent office

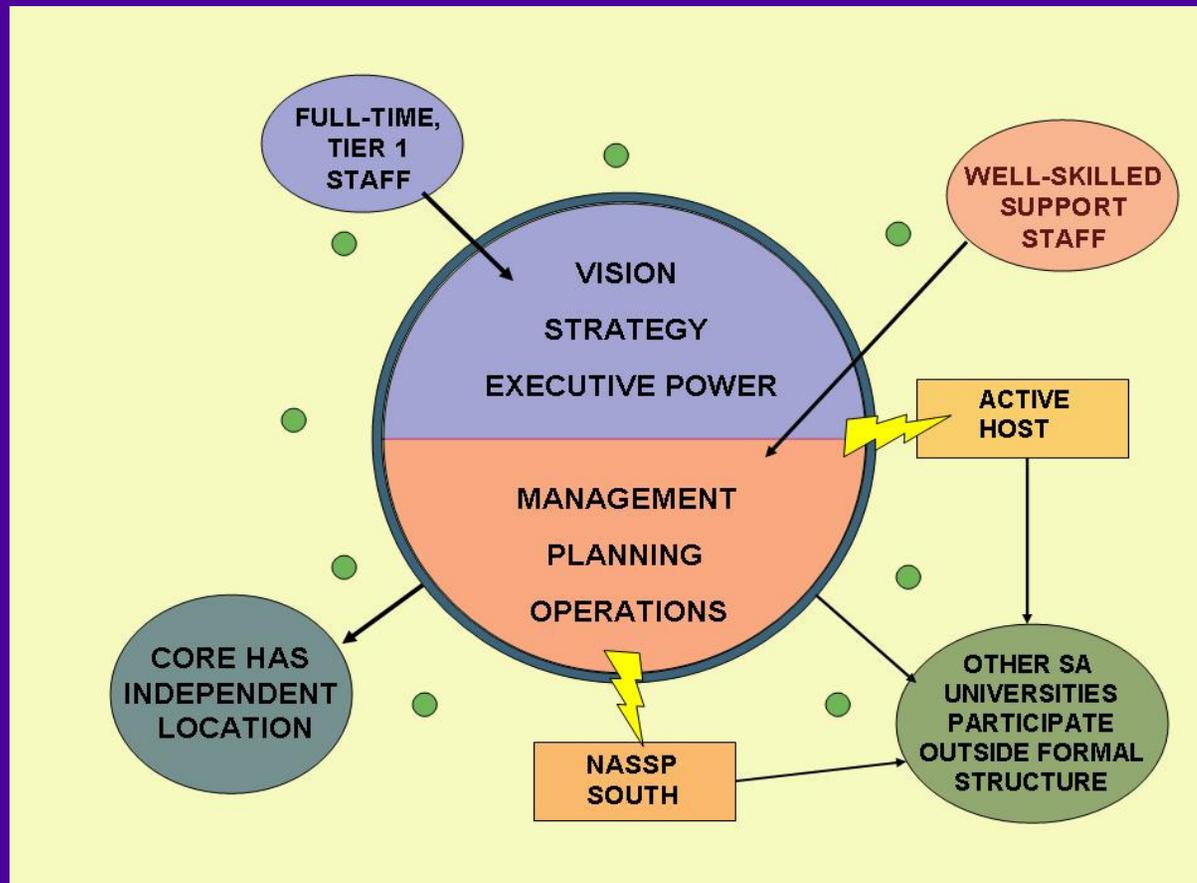**Rotate the hosting venue every 2-3 years**

**Use cutting-edge video technology and SANREN
for programme delivery**

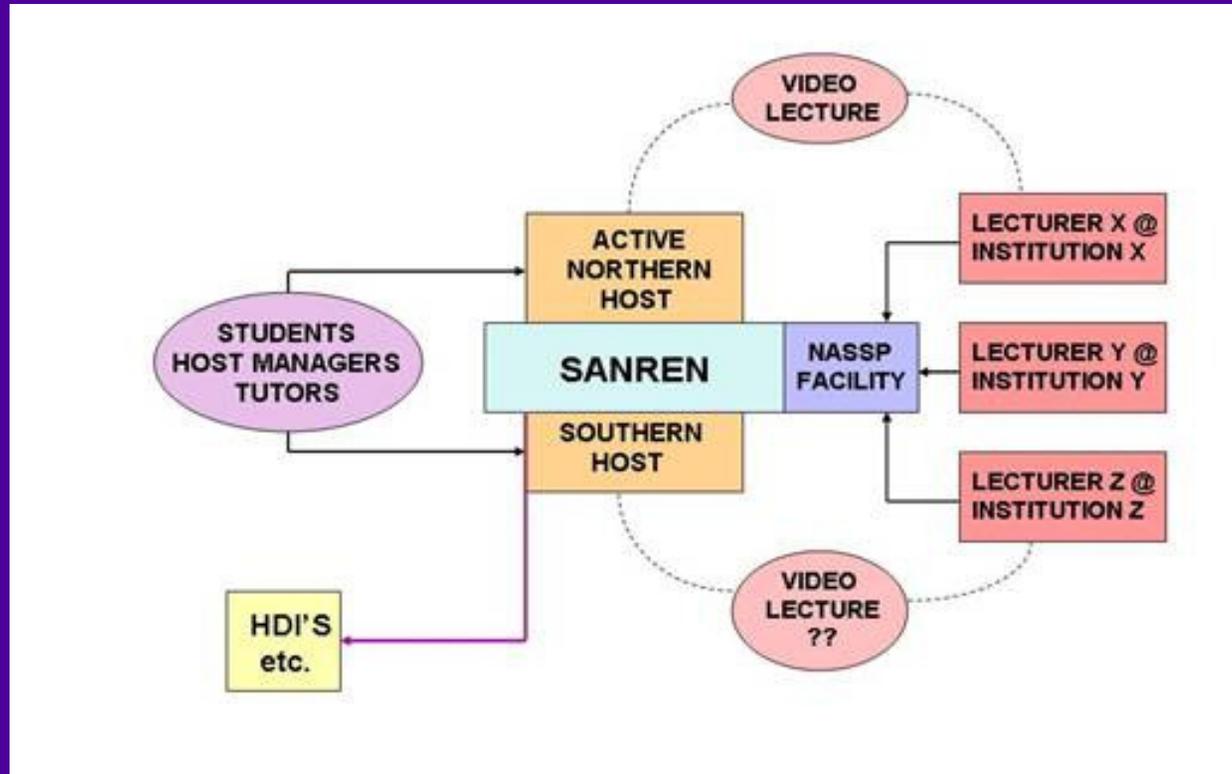# Manage NASSP from an independent core office

Rotate the hosting venue every 2-3 years

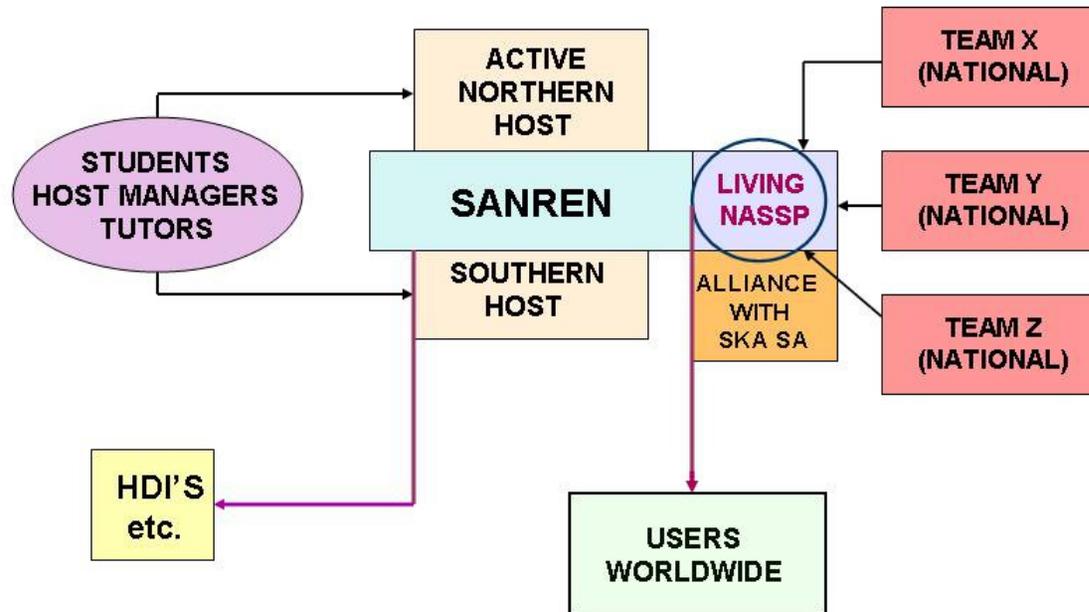# Manage NASSP from an independent core office

Rotate the hosting venue every 2-3 years

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NASSP as a National, African and International

Reference Project

Further Points (in brief):

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- Topics suggested as **electives** include:
- A range of topics in radio astronomy
- A range of topics in space physics
- A range of topics across the wavelength spectrum
- A range of topics in theoretical astrophysics and cosmology
- A range of topics in computational astrophysics and cosmology
(for all five of these general "topics in"categories, course choices should be informed by the actual research goals pursued by South African astronomers / astrophysicists / cosmologists)
- Masers
- Accretion Disks
- Dark Matter
- Astro-particle physics
- Gamma-ray astronomy

Further Points (in brief):

General

- Adopt a **fresh approach** to what NASSP should / might become

- Most members of the preliminary discussion group have been quite vocal in supporting a
  fully collaborative model, with all committed institutions collaborating on an equal footing

- Build on the **strengths of each region** in constructing these packages. As an example, the
  northern package should exploit the specific strengths in gamma-ray astronomy and astro-
  particle physics that exist in the northern part of the country.

- There should be a greater component of **well-designed project work** throughout the Honours
  year, as well as in the first 6 months of the Masters year, aimed at a more focused development
  of research skills.

- The **extended programme** should be introduced as a fixed component of NASSP2 from the outset.

- The overarching **strategy** of NASSP (as it might be reconstituted at the present time) should drive
  the programme content and structure (not vice versa).

Further Points (in brief):

General (continued)

- Specific attention should be paid to **demographic inclusivity** in the running of NASSP.

- A strategy should be formulated (and executed) to successfully **raise the number of black South African students** graduating at the Ph.D. level. If there are factors obstructing this outcome, they should be identified and addressed.

- Manage a strategically-determined **balance in the numbers of South African and foreign students** in NASSP, taking cognisance of the needs of the SKA project and the African VLBI network.

- Exploit NASSP as a **role model for generating scientific leadership** in Africa, in its design / evolution/practice, as well as in its products (well-skilled, well-rounded scientists).

- Make the current strong international commitment to the programme even firmer, by making optimal use of **international academics / research scientists as role models.**

- **Sell the vision** of what NASSP could evolve into and achieve, far beyond its initial remit, to national government but also to appropriate international bodies /organisations.

Conclusions

The proposal:

> Let us conduct an experiment with the following aim:
>
> The creation and delivery of a tightly-focused training programme to generate highly-skilled scientists and academics.

The method:

> Create a central programme core, co-ordinating a constellation of participating institutions
>
> Employ a digitally-driven (video-based) teaching model
>
> [perhaps:] Establish a web-based, living programme for delivering the required outcomes

Workshop on the Discussion Document distilled from the first round of interviews:
NRF Offices (Pretoria) on 13 November 2012:

Present (either physically or via Skype):

Saalih Allie	University of Cape Town
Adri Burger	Northwest University – Potchefstroom
Kim de Boer	SKA South Africa (only from 10:30)
Peter Dunsby	University of Cape Town (only from 12:00)
Fabio Frescura	University of the Witwatersrand
Chris Engelbrecht	University of Johannesburg (co-ordinator)
Michael Gaylard	Hartebeesthoek Radio Astronomy Observatory
Charles McGruder	Western Kentucky University
Pieter Meintjes	University of the Free State
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Management model

The proposal for creating an autonomous management core for NASSP, functioning separately from the actual teaching and learning operations, was put up for discussion. Strong support was voiced for this, provided that its ambit included the entire national programme. It was agreed that discussion on the functioning of this core should not be constrained by funding concerns. Rather, the best possible proposal should be developed, following which the funding of such a core could be explored.

The profile of the incumbent of such a position was discussed. It was agreed that the appropriate person(s) should have a suitable knowledge of South African astronomy, astrophysics and space science as well as proven management skills. Ideally, the incumbent would have a PhD in one of the aforementioned fields. It would be prudent to announce this position (when applicable) in the broadest possible forum(s), to draw in the broadest possible range of applicants for the position. There was a general feeling that the job would be either a full-time position or at least an "almost-full-time" position, leaving perhaps some scope for individual research as well.

Institutional Participation Model

The point of departure for this discussion was the proposed "rotating host" model, where all the students enrolled in any particular year would be hosted at a single location for the duration of that year, but with the actual location rotating every 2-3 years, among institutions willing and able to allocate the resources (human and otherwise) to fulfill the demands associated with acting as a host.

Questions were raised as to how the administration of the programme would be managed in this model. Institutional idiosyncracies differ from institution to institution and it was perceived that this would complicate a smooth continuation of the programme from one host to the next. There was strong agreement with the notion that, besides a national manager(s) looking after strategic and funding aspects of the programme, there would need to be an operational management team in place at any particular host. Such a team might consist of current staff members of the host institution who would be "bought out" for the years that the institution hosts the programme.

Institutional Participation Model

Another proposal was that a management committee composed of representatives from all participating institutions should play a strong role in managing the programme.

It was pointed out that the mode of financing the students is institution-specific and that this aspect of the programme needs to be explored very carefully. In conjunction with this, the infrastructure requirements (especially buildings/rooms) could be rather difficult to satisfy for a 2-3 year period at most institutions.

In general, it was foreseen that one of the main challenges of the rotating-host model lay in ensuring continuity and student cohesion.

Strong support was voiced for the suggestion that institutions should be canvassed in the very short term to ascertain which ones would actually be in a position to act as hosts in this model right away (or at least within the next few years). Representatives from UKZN, WITS, NWU and UJ indicated that they would follow up with the relevant bodies/persons at these institutions, to obtain certainty of commitment in this respect.

Course Delivery Mode

The point of departure was the proposal of a fully digitally-driven teaching model that would use the most advanced video technology currently available.

It was suggested that it would be practical to implement this mode only in the Masters coursework component initially, since students enter the Masters programme with a common background and with well-established networks having been established in the Honours year.

There was strong support for spreading a digital course over the full extent of a semester (rather than three weeks), and to use one week at the start of the Masters programme for students to physically meet with the lecturers so that the necessary socialisation can take place.

Course Content

Strong support was voiced for an expansion of the current portfolio of available courses.

Strong support was also voiced for the proposal that a single lecturer should teach any particular topic in the national programme, via video-link to all participating hosts (with a physical class perhaps present with the lecturer at his lecturing post, if appropriate). Two (related) advantages are associated with this model: The total workload on the academic community is rationalized, and uniformity of course content in any particular topic is assured.

It was emphasized that an appointed committee should have direct management responsibility over course content and course administration (specifically: the creation and maintenance of appropriate course material, including notes), to ensure uniform levels of quality and continuity across the programme.

An appeal was made to include space physics in an expanded (elective-rich) curriculum, and clearly denote its presence in the programme.

Course Content

As a general principle, very strong support was voiced for incorporating the taught NASSP programme into a "Living Programme" in astronomy, astrophysics and space science, that would reside on the Web. Such a programme would be accessible worldwide and, if executed well, could be a valuable advertisement for South African (and African) astronomy, astrophysics and space science (AstSS).

The MIT OpenCourseware suite offers an example of such a programme. Perhaps more importantly, it would provide a means by which South African universities that are not part of the national AstSS community might gain entry, by using the Living Programme as an introduction to AstSS at those institutions. Similarly, the expansion of the African VLBI network and the SKA project into many parts of Africa might be aided by the existence of such a programme.

Such an enterprise would of course require considerable amounts of planning and co-ordination, but the general view was that the potential impact would be worth the effort.

Timelines

It is not yet clear which hosts can be ready to implement a programme in 2014/5.

Also, it is not yet clear exactly what form an extended [expanded] NASSP programme will take.

Therefore, it is not yet possible to present a clear-cut table of needs and requirements to prospective hosts.

However, while these issues are being clarified, work on a digitally-driven course programme can start immediately. The goal of establishing an eventual Living Programme can direct course design from the outset.

A strong proposal was put forward to get a full suite of courses at Masters level - suitable for the digitally-driven delivery - ready during 2013.

A further proposal was put forward that institutions should be canvassed to gain clarity on where AstSS programmes (under the NASSP umbrella) could be introduced at Honours level in 2014, with at least 5 students enrolling at any particular host. It would be good if such information could be made available at the January meeting at HartRAO.

Other Issues

1. Partnerships

KdeB confirmed that the SKA might look at partnering with NASSP where it made sense to do so. (For example, in establishing links between NASSP and other African countries).
Partnership with SANSA is favoured with respect to Space Science aspects of NASSP.
Formal partnership with NITheP should be explored, with a view to strengthening theoretical astrophysics practiced in South Africa through courses in the NASSP portfolio.
Partnership with SANReN (SA National research network) was discussed.

2. Demographics

Roadshows aimed at attracting more black and/or female students would be an essential component of any proposal to procure NASSP funding from government.
the drive to establish a digitally-driven teaching programme might render it more prudent to focus on getting more HDI's on board than recruiting more black students individually.

3. Outreach

Developments in AstSS (The AAS, AVN, SKA) requires that we keep our involvement in the rest of Africa in sharp focus. In particular, engagement with the AAS can proceed through CMcG and Hakeem Oluseyi

Final Points:

It was emphasized that NASSP must run as a unitary, national programme and that admissions will therefore need to be handled centrally, perhaps with prospective students indicating their preferences amongst the various hosts existing in an expanded programme.

A working goal of the present initiative to expand NASSP should be to:

"Build a National Astrophysics and Space Science programme that is *distributed across the country* while *operating as a unit*"

It appears practical and useful to develop a *northern network* in NASSP, rather than a *northern node.*

Points added from the UCT perspective:

The most important issue in evolving an extended NASSP is to *not* disrupt the current programme while new ideas are being considered and applied.

A substantial problem with a rotating-host model is the loss of experience when the programme administrator changes [this assumes a host-specific administrator; a national management team could avoid this problem].

While digitally-driven courses are a good idea in principle, great care will need to be exercised in their development and delivery. Specifically, students' natural preference for face-to-face teaching will need to be addressed thoughtfully in the design and delivery of virtual lectures.

On the relative merits of 3-week and semester-long virtual courses: A digital course needs to be adapted to its medium and to its delivery timeframe.

The January meeting should be used to debate the curriculum, going forward.

Subsequent discussions in the NASSP Steering Committee and Executive Committee

Launch one (or possibly two) Masters courses in video-lecturing format during 2013, and identify which institutions will be prepared to host a northern node from 2014 onwards.

Discussions leaned towards one or more permanent hosts in the north, rather than rotation from one host to another every few years. It was emphasised that the expansion of NASSP to the north should be done carefully and not rushed.

Given the current funding constraints and past experience with NASSP, the view was voiced at ExCo that we should be careful not to try and achieve too much, too quickly.

Specifically, it was proposed that we pilot a second host with a small number of students at first, perhaps 5 – 10, to ensure that the process remains manageable and the outcome is successful.

Subsequent discussions in the NASSP Steering Committee and Executive Committee

Any institution that is willing to explore hosting a NASSP node should be made fully aware that the goal would be to eventually reach a stable scenario where about 25 students are hosted every year. An interested institution should therefore be prepared to set aside the infrastructural, staffing and financial resources that will be required to ensure a sustainable programme in the long run.

It was proposed that, in the absence of any dedicated Astronomy departments in the country outside UCT and UNISA (counting the sub-department there), the most logical approach to expanding NASSP would be to evolve an astronomy/astrophysics/space science component inside existing departments of Physics (as has already happened in a few departments across the country). Institutions interested in hosting a NASSP node should seriously consider following this avenue. It was proposed that a sensible first step along this road would be for an interested institution to establish elective courses in astronomy/astrophysics/space science in its Physics Honours programme.

Annexures :

NASSP 2 PRELIMINARY WORKING GROUP - ARRAY OF POSSIBILITIES

PROSPECTS	HOSTING MODEL				DELIVERY MODEL		
	SINGLE HOST (STATUS QUO)	ONLY 2 HOSTS (ONE SOUTH/ONE NORTH)	PARALLEL HOSTS (PERMANENT)	ONE PERMANENT HOST (SOUTH) AND ROTATING HOSTS (NORTH)	TRADITIONAL (CHALK 'N TALK)	VIDEO LECTURE	WEB-BASED PROGRAMME (LIVING)
Centralised Management of entire national (multi-node) programme led by a full-time or "almost full-time" person with appropriate knowledge of SA astronomy/astrophysics and management skills, looking after strategic planning and fundraising	OK	OK	OK	OK	OK	OK	OK
Operational manager at host site(s) - senior person at academic level, supported by operational staff who execute the day-to-day tasks required to keep the programme running	1 team at 1 site	2 teams at 2 sites	multiple teams at multiple sites	complicated matrix of roving and stationary personnel	OK	quite some adaptation required - steep learning curve	high degree of adaptation required - very steep learning curve
Student numbers per host	~ 25	~ 25	25 (south) 8 - 15 (north)	~ 25	25 or 25 and 8 - 15	25 or 25 and 8 - 15	unlimited
Training overheads	minimal	low to medium: duplicate status quo with once-off training at one host	medium to high: duplicate status quo with once-off training at multiple hosts	high: repeated training	minimal	moderate	moderate
Demands on course lecturers / designers / co-ordinators	as status quo	as status quo, but duplicated	as status quo, but multiplied	as status quo, but multiplied	as status quo	new skills required	new skills required
Demands on Steering Committee / ExCo	as status quo	moderate increase over status quo	moderate increase over status quo	moderate to high increase over status quo	as status quo	moderate increase over status quo	moderate increase over status quo
Financial requirements	as status quo	~2 x status quo	> 2 x status quo	> 2 x status quo	status quo per site	needs detailed budget; could be lower than status quo	< status quo
Impact on SA astronomy/astrophysics	as status quo	heightened	heightened	heightened	heightened if extended to more than one site	can not be stated unequivocally	can not be stated unequivocally
Impact on African astronomy/astrophysics	status quo	heightened	heightened	heightened	heightened if extended to more than one site	can not be stated unequivocally	hugely increased

Annexures :

PARAMETER	HOSTING		DELIVERY MODEL		
	FULL HOST (25 STUDENTS)	PARALLEL HOST (8 - 15 STUDENTS)	TRADITIONAL (CHALK 'N TALK)	VIDEO LECTURE	WEB-BASED PROGRAMME (LIVING)
STAFFING	0.5 academic 1 - 2 admin	0.5 academic 1 - 2 admin	0.5 academic 1 - 2 admin	0.5 academic 1 - 2 admin	0.3 academic 0.5 admin
INFRASTRUCTURE 1: OFFICE SPACE	Existing academic plus 2 admin	Existing academic plus 2 admin	as under HOSTING	as under HOSTING	Existing academic plus 0.5 admin
INFRASTRUCTURE 2: LECTURE ROOMS	25-seater	15-seater			0
INFRASTRUCTURE 3: IT STAFFING	0.5 staff	0.5 staff			0.5 staff
INFRASTRUCTURE 4: STUDENT ACCOMMODATION	25 rooms	15 rooms			0
FINANCE 1: STUDENTS	??	??	as under HOSTING	as under HOSTING	0
FINANCE 2: STAFF	??	??			??
FINANCE 3: OVERHEADS	??	??			??

NASSP - requirements incumbent on a prospective host

The Way Forward……….

some ideas:

The AstSS community in the northern part of the country is dispersed in many pockets, each with approx. 2 – 8 professionals.

→ the model followed in CT can not be transferred - as is - to the North

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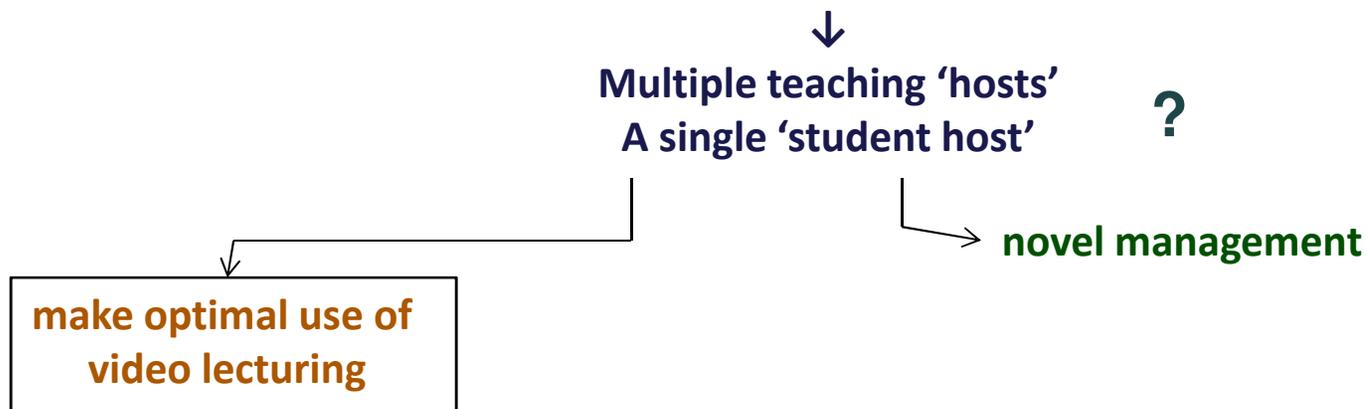**→ the model followed in CT can not be transferred - as is - to the North**

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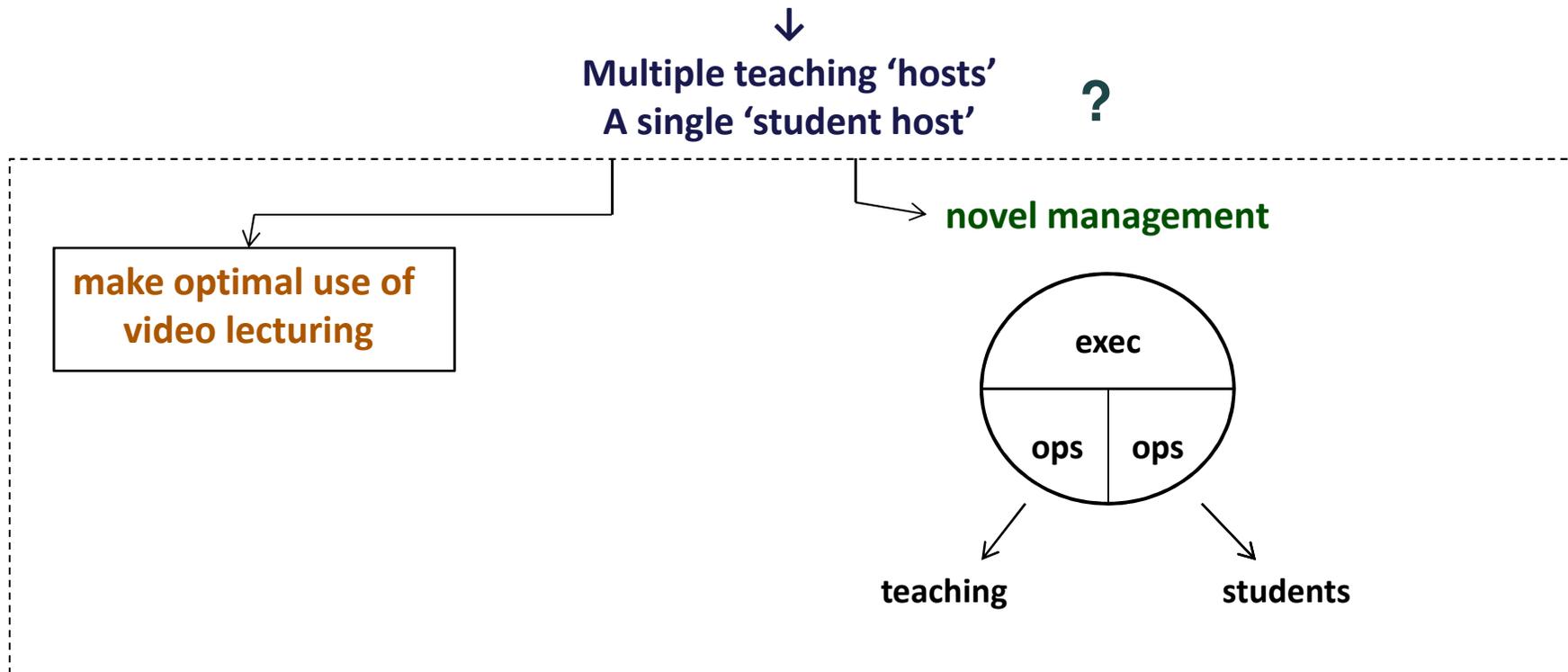
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