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TNA-prime
An idea for an alternative to OPTICON/TNA

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OPTICON

Current OPTICON/TNA (talk of JKD)

- A total of 17 (1m to 4m class) robotic/classical telescopes across the globe
- 1871 users from 43 countries applied for time so far
- 86 PIs from 17 countries granted time, ~260 refereed papers published
- Currently operation cost is nearly ~20% of OPTICON budget
- Strong points of TNA
  - *Objectively validated quality of telescopes/instrumentation offered*
  - *Much appreciated financial support to facilities participating in TNA*
  - *Concept highly appreciated by the scientific community as indicated by the publications, proposal oversubscription and diversity of projects implemented*
- Challenges current and ahead
  - *Difficult to evaluate/award proposals related to either transient targets or long-term projects*
  - *Current TNA management structure limits modifying and/or increasing the size of the telescopes in the network*
  - *Upcoming changes in the OPTICON budget may provide new TNA opportunities*

OPTICON/RadioNet Pilot (ORP) TNA'

Given the maturity and experience gained from the current OPTICON TNA, and the anticipated reduced budget, one may consider a new scheme (not more of the same) say a TNA-prime (TNA'), aiming to have as main goals:

- Reduced centralized management (and cost) of the telescopes used
- Allocate resources to software (ie pipeline) development related to data acquisition and processing
- Greatly expand the current TNA network by including more (smaller?) telescopes with science quality instrumentation
- Develop a community-regulated, more flexible operational TNA model, which is self-sustainable even beyond the duration of the upcoming PILOT program
- Encourage the funding of TNA' facilities from national resources
- Encourage/influence future research in key science areas, in particular in the emerging field of multi-messenger / time domain astrophysics

OPTICON/RadioNet Pilot (ORP) TNA'

The basic assumptions of the proposed ORP-TNA' scheme are:

- There is ample observing time at telescopes with D=<2m having acceptable instrumentation, which is not currently properly identified and easily accessible to the community (already indicated in L.Wyrzykowski's talk)
- The scientists managing these telescopes often have limited experience on how to tackle pertinent science questions with their facilities
- There is an increasing community need to obtain access to a large number of telescopes for mutli-wavelength coordinated observations (ie AGN monitoring, exoplanet detection, transient follow-ups, GAIA alerts, Zwicky TF, LSST)
- There is an increasing trend for observations to be performed in queue/ remote mode
- The key to obtain access to these facilities is not buying time using $, €, £ but instead providing to the local groups:
  - *co-authorship in scientific publications*
  - *inclusion in international research networks and science training*

ORP-TNA' Implementation Scheme

A possible implementation scheme of a new ORP-TNA' would be:

- A web-based platform is developed in which may register:
  - *Telescope Directors (TDs) interested to provide a fraction of the time of their facilities under the proposed scheme*
  - *General Observers (GO) wishing to access the telescopes of the platform*
- The TDs provide in a uniform manner a minimal description of their facilities
  - *Telescope location, mirror size, available instrumentation*
  - *Observing time (calendar form) available to the community under the scheme*
  - *Typical weather and seeing conditions*
  - *Typical response time to a request to use the telescope & contact person (TCP)*
  - *Type of science projects considered compatible with local research interests*
- The ORP-TNA' board develops a generic MOU, to be signed by the TD and the GO, describing a code of conduct and specifying co-authorship of select facility personnel to publications of the GO resulting from the observations
- The ORP-TNA' board defines a handful of broad science areas which would benefit from collaborative use of multiple telescopes, possibly divert funds to support organization of workshops / community training in those.

ORP-TNA' Operation Mode

The operation mode ORP-TNA' would be:

1. A GO logs into the platform and identifies the telescopes suited & available for her/his science project
2. The GO submits via the platform the request to use the selected telescope(s) directly to the specified contact person of telescope(s) (TCPs) providing a brief description of the project in mind.
3. The TCP(s) evaluate the request and reject(s) or accept(s) it. Once accepted the GO and TD(s) automatically sign the MOU and the commitment to provide the telescope time can not be withdrawn

- Completion of the above three steps in the system would lead to creating an observing "campaign".
- The fact that the specific telescope(s) have been booked for the given period becomes visible in the system to all future users.
- Once the campaign is complete the GO evaluates the facility and observing performance and the TCP evaluates the technical info provided by the GO
- If/when a publication results from the observation a link to it is added in the system by the TCP and is associated to the "campaign"

ORP-TNA' Operation Challenges

The successful operation of ORP-TNA' faces a number of challenges:

- Risk in the quality of the science since there's no TAC proposal evaluation
- Risk in the quality of the facilities offered since there no prior validation
- No $, €, £ may reduce access to 3-4m class telescopes?
- GO authentication to restrict the system to scientific community
  - *Using ORCID & institutional e-mail?*
- Resolving proposal duplications.
  - *What if more people have the same idea and request the same telescope*
  - *Would one use a "first-come first-serve" approach?*
- Devising a metric to avoid "overbooking" of facilities by few teams.
  - *Limit to 1-2 accepted "projects" per GO per year?*
- Resolving MOU conflicts. What if people who obtained data do not publish or do not include the local teams in their publications?
  - *Have as a penalty their exclusion from the system?*
- Do data obtained under the scheme become public after a year? If so who is responsible to make them public (probably the TDs in their webservers)
- Given the typical 1-2 year time delay between proposal submission and science paper acceptance, how quickly can self-evaluation of the parties involved self-regulate the system into a stable state?

ORP-TNA' Advantages

There are a number of potential long-term advantages of the proposed scheme

- It's quite different from what we currently have ("no more of the same")
- Possibly increase the number of TNA telescopes by an order of magnitude (enhanced offering) setting the stage to accommodate a community need of coordinated optical/near-IR/radio follow-ups in time domain astronomy produced by facilities such as LSST, Zwicky TF, Swift, GW detections etc. Currently there are at least 50 2-3m class telescopes and over 100 telescopes in the 1-2m range (not including semi-professional amateurs)

  https://en.wikipedia.org/wiki/List_of_large_optical_telescopes
- Significant reduction in operational costs:
  - *Development cost of the platform is small (~1 FTE of an IT person), while the management minimal (~0.2 FTE per year) easily covered by an institution.*
  - *Future conflicts related to MOU could be resolved by a TDs steering committee (similar to other community supported science projects – ie arXiv)*
- Increase the potential of participating infrastructures to obtain national funding (engagement of funders) to support upgrade their facilities since they'll provide an easily documented service to the international scientific community. Address long term TNA sustainability.
- Enable future versatility / additional services (ie automated pipeline data analysis by expert partners such as *Cambridge Photometry Cal Server*)