



Big Science
Business
Forum
2022

SKAO Software - matching procurement to agile development practices

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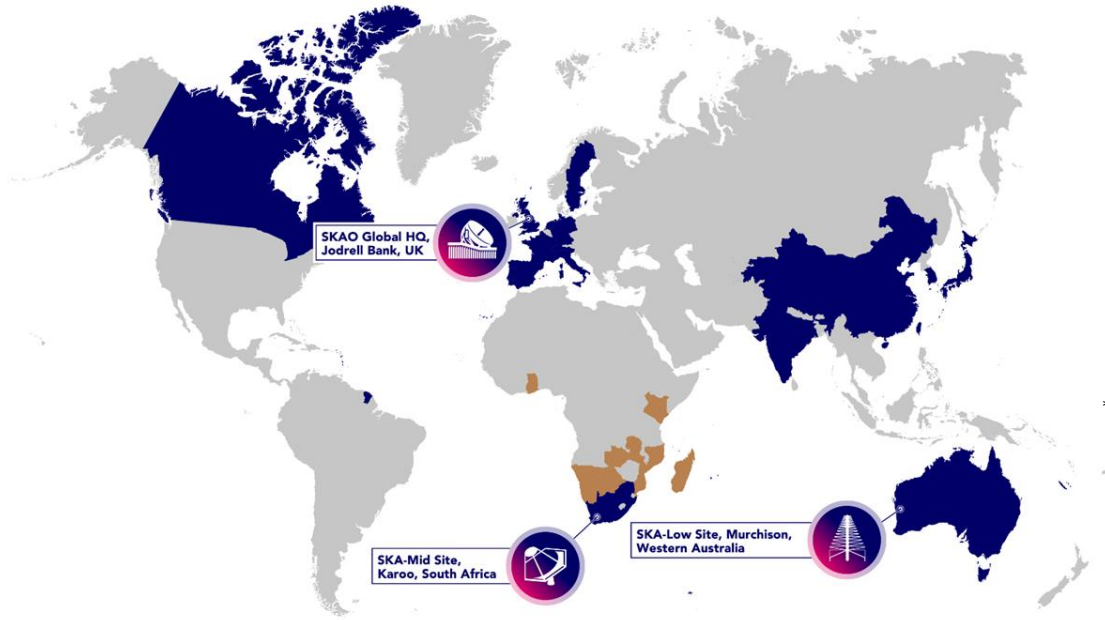


Outline

- Reminder about the SKA
- Contracting Requirements and Theory
- The SKA software contracts



SKA Observatory – a reminder: One Observatory, Two Telescopes, Three Continents



SKAO Partnership - includes SKAO Member States* and SKAO Observers (as of June 2022)



African Partner Countries



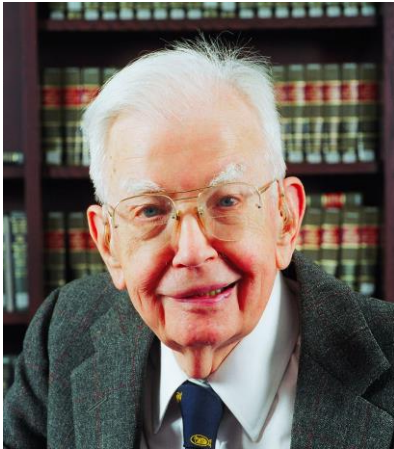
SKA Software

- The size and scope of SKA software is **huge**.
- With a project of this size and diversity, we need a modern approach to software development, using world leading standards and processes.
 - These are more robust than home grown ones.
 - They also provide a ready-made expert community that can be consulted.
 - Training and books are immediately available.
 - Contractors are often familiar with them.
- We have adopted the Scaled Agile Framework¹ (SAFe®) to harmonize the development processes.
 - Note that all large-scale lean/agile processes are very similar - the choice of SAFe was largely for pragmatic reasons.
- We needed contracts to match these processes

¹<https://www.scaledagileframework.com>



Selected history of contracting theory¹

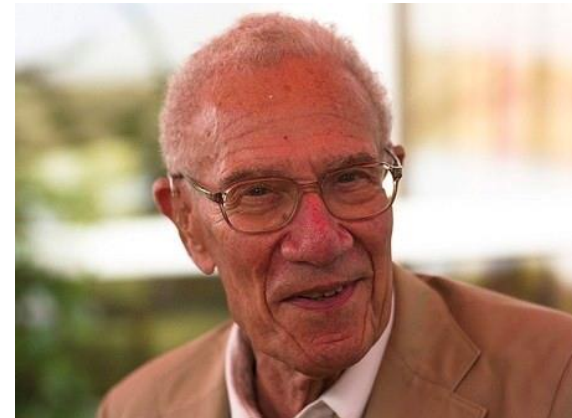


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Ronald Coase in “The Nature of the Firm” (1937) taught us how transaction costs govern how to efficiently out-source work. Ignoring them and optimising a small aspect of total price is inefficient.

Robert Solow showed that 87% of growth is from technical progress. Innovation is more important than cost and human efficiencies. Factors that are prescriptive and limit innovation limit growth.

¹Based on a paper by Kate Vitasek: *Go “Back to the Basics” for Strategic Outsourcing and Contracting*. Contract Management Magazine, May 2021



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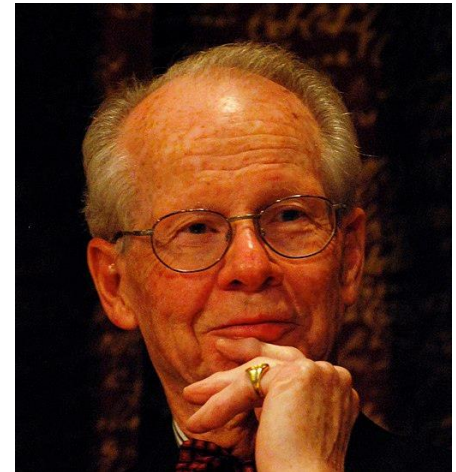
Selected history of contracting theory¹



John Nash in his game theory studies showed how win-win solutions which maximise the return for both the individual and the group consistently outperform other strategies.

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Oliver Williamson's "Theory of incomplete contracting" extended transaction cost economics by looking at the impact of trust and relationships - "all complex contracts will be incomplete—there will be gaps, errors, omissions and the like". To succeed you must be flexible and build trust.



¹Based on a paper by Kate Vitasek: *Go "Back to the Basics" for Strategic Outsourcing and Contracting*. Contract Management Magazine, May 2021



Selected history of contracting theory¹

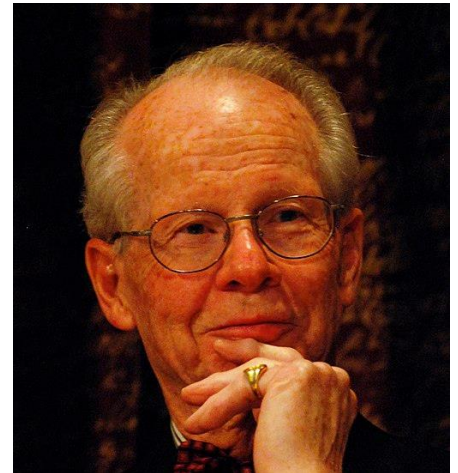


Dan Ariely pointed out that “most of us think of ourselves as honest, but, in fact, we all cheat.” We often tell “white lies” to defend our ego, and these “dishonesty germs” can rapidly become infections and impact our relationships. This is especially true in contractual relationships.

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Oliver Hart coined the term “shading” for the effect that a contracting party stops cooperating if the other party doesn’t act reasonably. He advocates incorporating “guiding principles” into a formal contract keep parties aligned.

¹Based on a paper by Kate Vitasek: *Go “Back to the Basics” for Strategic Outsourcing and Contracting*. Contract Management Magazine, May 2021



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What are our contracting requirements?

- We must focus on generating great software.
- The contracts must match our agile processes
 - Agile methods accept that the scope is incomplete and rely on trust and honesty in the relationship to succeed.
- We must reduce transaction costs by:
 - Promoting collaboration and reducing unnecessary overheads (the lean concept of waste)
 - **Not** creating friction or hindering progress if things change.
- We must make it clear what our needs are and who pays for what.



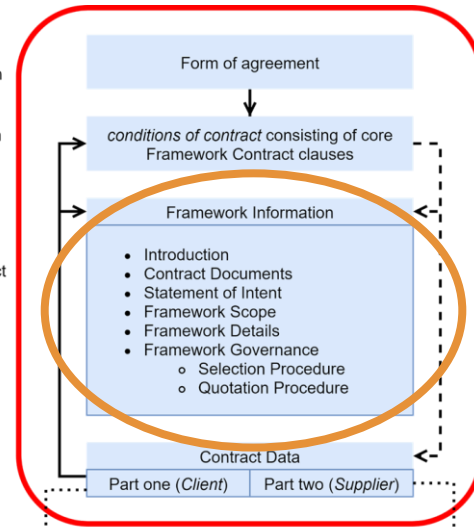
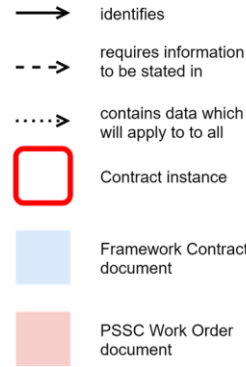
Our approach - relational contracting

- The main goal of the SKA Computing and Software contracts is to promote and maintain good relationships.
 - We use NEC4, but wanted to push beyond the NEC4 standard of “cooperation” and set up a true collaboration.
 - See <https://www.neccontract.com/>
- To do this we have also adopted the “Vested[®]” approach to relational contracts and merged it with NEC4.
 - See <https://www.vestedway.com/>

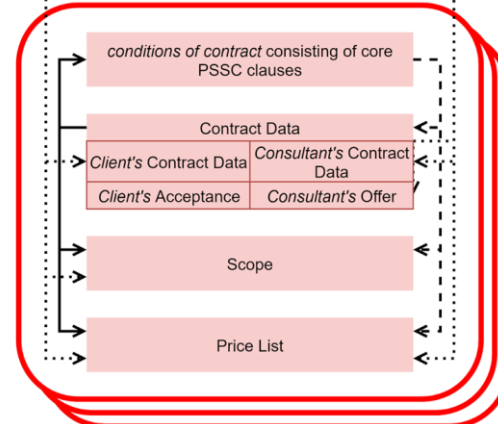


Contract Structure

- One NEC4 Framework contract per supplier for the whole of construction.
- Work committed and delivered using NEC4 Professional Service Short Contracts as work orders.
- 22 suppliers, 29 organisations, but all contracts are identical - no special snowflakes.
- Core “playbook” is the Framework Information



Single Framework Contract Governing all PSSC Work Orders



Multiple consecutive PSSC Work Orders starting and ending on 3 month planning boundaries.



Framework Information



- This is based on the Vested approach
- Developed in conjunction with future potential suppliers before raising the contracts
- A working document that is updated when generally agreed.
- The “Scope” is one paragraph (just over 5 lines) and is repeated in all work orders.
- The focus is on:
 - relational foundations
 - governance to manage change
 - work orders to manage risk

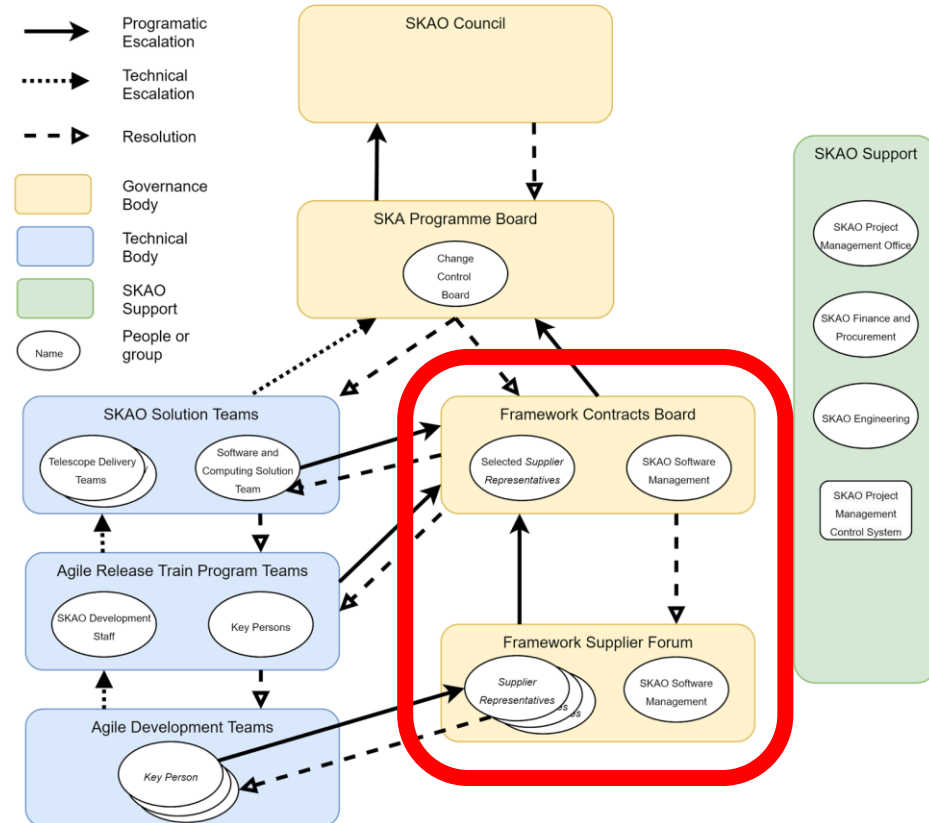
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Framework Governance

- The governance bodies fit in a structure that includes the technical teams and the project oversight bodies.
- The Framework Supplier Forum includes representatives of SKAO and all suppliers
- The Framework Contracts Board comprises 7-9 people from both SKAO and suppliers
- Both bodies support the SKAO Project Manager to achieve the goals of all parties.



Summary and Conclusions

- Agile software development is, by definition, impossible to completely specify in a contract.
- Modern contracting theory clearly states that if a contract is incomplete, the contract should be relational, not transactional.
- Relational contracts have a simple scope but require shared up-front discussion between the parties to define statements like a shared vision, strategic objectives, guiding principles and behaviours.
 - Unlike traditional contracts, these cannot be defined by the client alone.
- At the SKAO we have successfully implemented this, and it has been very well received by all parties.
 - The transaction costs associated with contractual disagreements have been eliminated and the focus is on the software.

