



ASTRON

Netherlands Institute for Radio Astronomy

ASTRON & sustainability

turning Amperes into BTUs while making discoveries happen

Chris Broekema

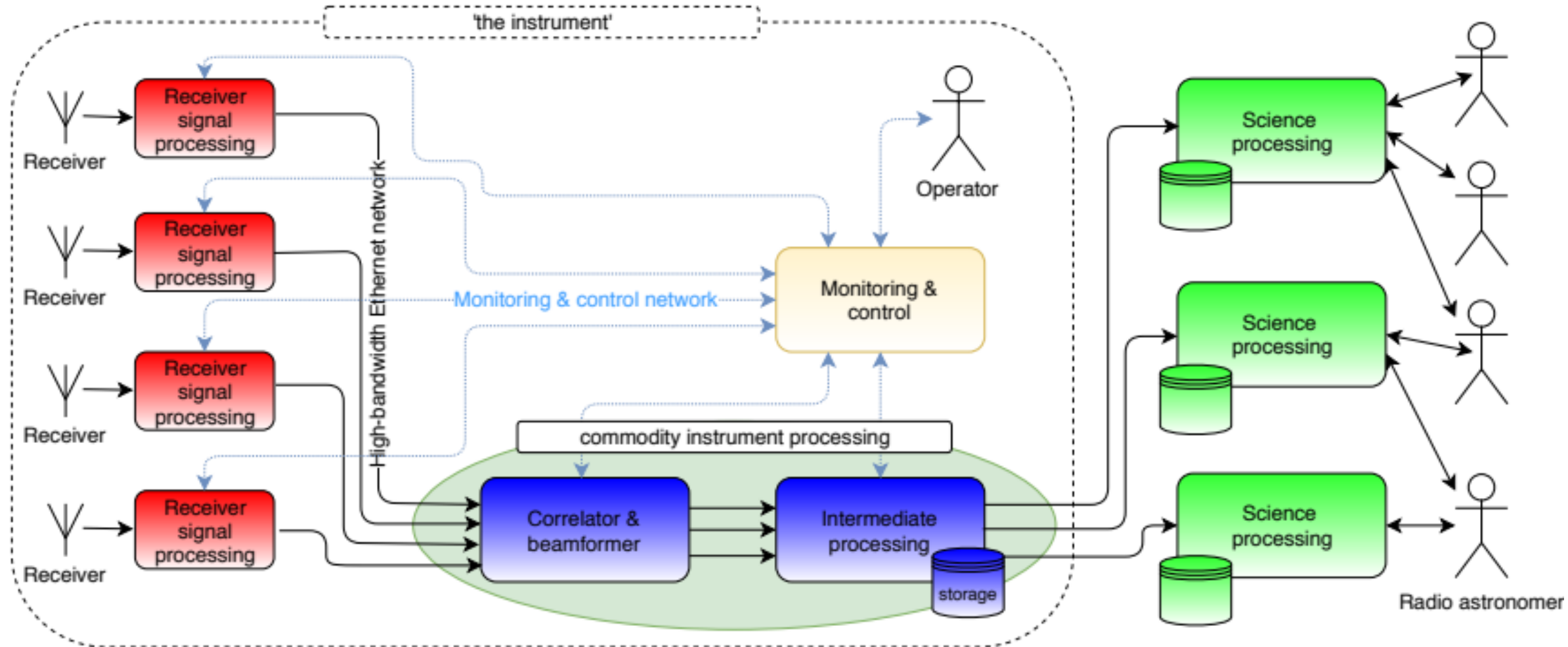
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Data-intensive science has a huge challenge



Processing is becoming unaffordable

3.5. Computational Cost

It took $\sim 52,000$ core hours to generate this $1.2'' \times 2''$ image from the 8-hour LOFAR LoTSS observation data for the ELAIS-N1 field, which is nearly five times quicker than sub-arcsecond imaging (requiring $\sim 250,000$ core hours (Sweijen et al. 2022)).

The approximate core hour distribution for this process includes $\sim 2,000$ for calibrating all Dutch stations using **Prefactor**, $\sim 10,000$ for direction-dependent calibration for Dutch stations with the ddf-pipeline, $\sim 7,000$ performing direction-independent calibration for international stations, $\sim 10,000$ for subtracting the 6'' model, and another $\sim 10,000$

TECHNIEK MAAKT JE WERELD

DE INGENIEUR

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Zoeken



FOSSIELVRIJ
VLIEGEN



STROOM TE DUUR VOOR RADIOTELESCOOP LOFAR

15 SEPTEMBER 2022

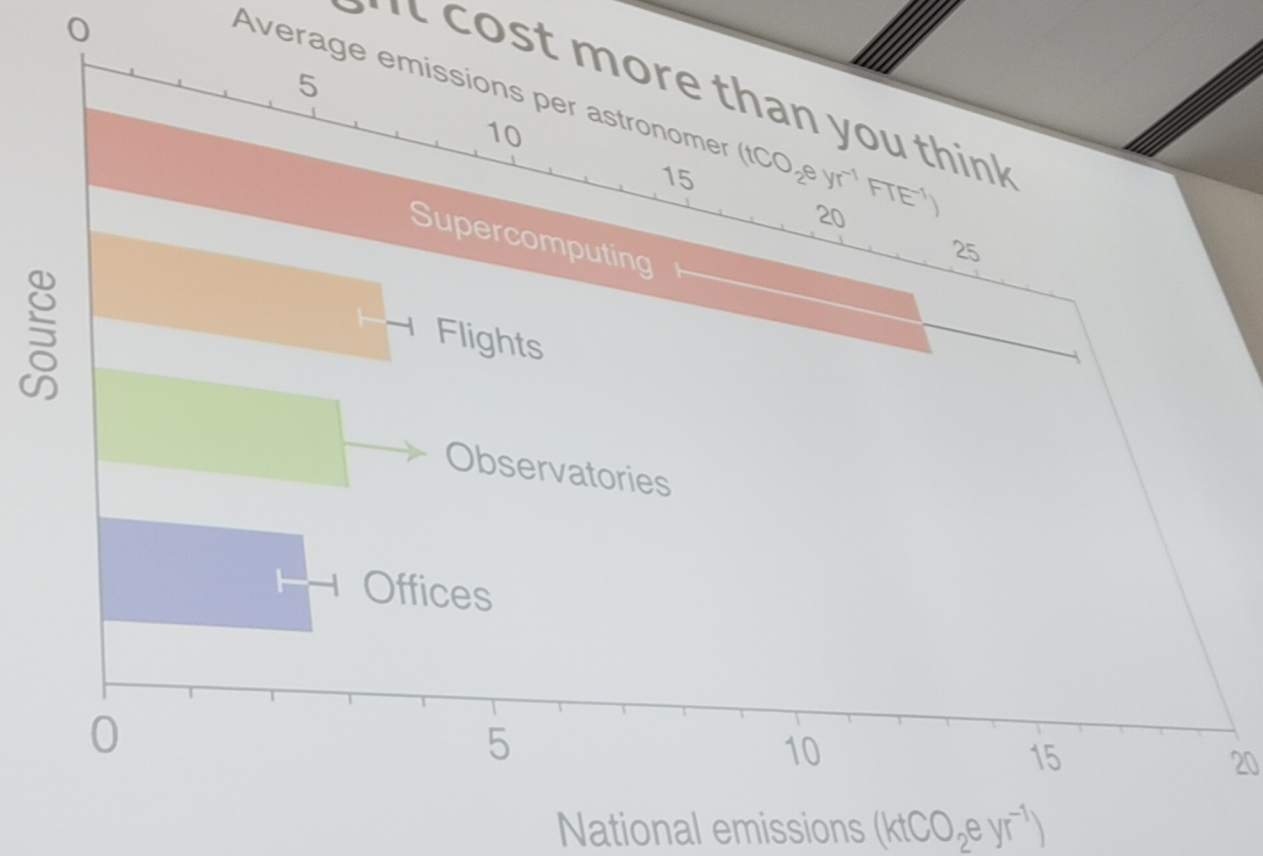


De energiecrisis maakt onverwachte slachtoffers. Zonder noodhulp kan de radiotelescoop LOFAR in Drenthe de stroomrekening niet meer betalen. De kosten zijn drie keer zo hoog sinds het energiecontract afgelopen zomer moest worden vernieuwd.

ARTIKELLEN

ASTRONOMEN HEBBEN LAST
VAN ELEKTROMAGNETISCHE
STRALING SATELLIETEN
SPACEX
5 JULI 2023

Computing might cost more than you think



The imperative to reduce carbon emissions in astronomy
A.R.H Stevens et al. Nature Astronomy 2020



Addressing the challenge

- Users don't care
 - Or rather, they care but don't feel empowered
- Papers matter, tonnes of CO₂ don't

the cluster already exists. It uses power even if we're not using it for intensive computing at the moment. I mean, it uses a little bit of power. It's not like it's using full power, but it's on.

give a public talk on exoplanets and one of the points I can and do make regularly is while we find all these exoplanets, none of them look like a planet B.

maybe I could write more efficient algorithms or something, I don't know. Not really. That one's outside my skillset. I write terrible computer code. Or it would just be a huge investment of my time to learn.

I think I wouldn't do it on a single-person level at this moment. I would like the institute itself just to stand up first and say something.

University of Groningen

Making Data-Intensive Science Sustainable — Towards Establishing Appropriate Incentives


Bachelor's Thesis

To fulfill the requirements for the degree of
Bachelor of Science in Computing Science
at the University of Groningen under the supervision of
Prof. V. Andrikopoulos (Computing Science, University of Groningen)
and
Dr. P.C. Broekema (ASTRON)

So applied computer science to the rescue

- Visualise and disseminate environmental impact
- Focus on performance optimisation in all aspects
 - Computational performance
 - Energy efficiency
 - Co-design
 - (responsible) use of AI
- More general: move Computer Scientists' efforts more into the astronomers' wheelhouse

Introducing LENSS



ASTRON receives €4.6 million to widen and sharpen LOFAR's cosmic vision

[ASTRON](#) › [TELESCOPES](#) › [LOFAR](#) › [ASTRON](#) —
RECEIVES €4.6 MILLION TO WIDEN AND
SHARPEN LOFAR'S COSMIC VISION



The Dutch Research Council (NWO) has awarded over €4.6 million to ASTRON, the Netherlands Institute for Radio Astronomy, for a major upgrade to the Low-Frequency Array (LOFAR) radio telescope. The project, called LOFAR Enhanced Network for Sharp Surveys (LENSS), will significantly increase LOFAR's observational capabilities, enabling astronomers to view four times more of the sky simultaneously while producing images with unprecedented clarity.



