Something is rotten in the state of geodesy

A play in four acts

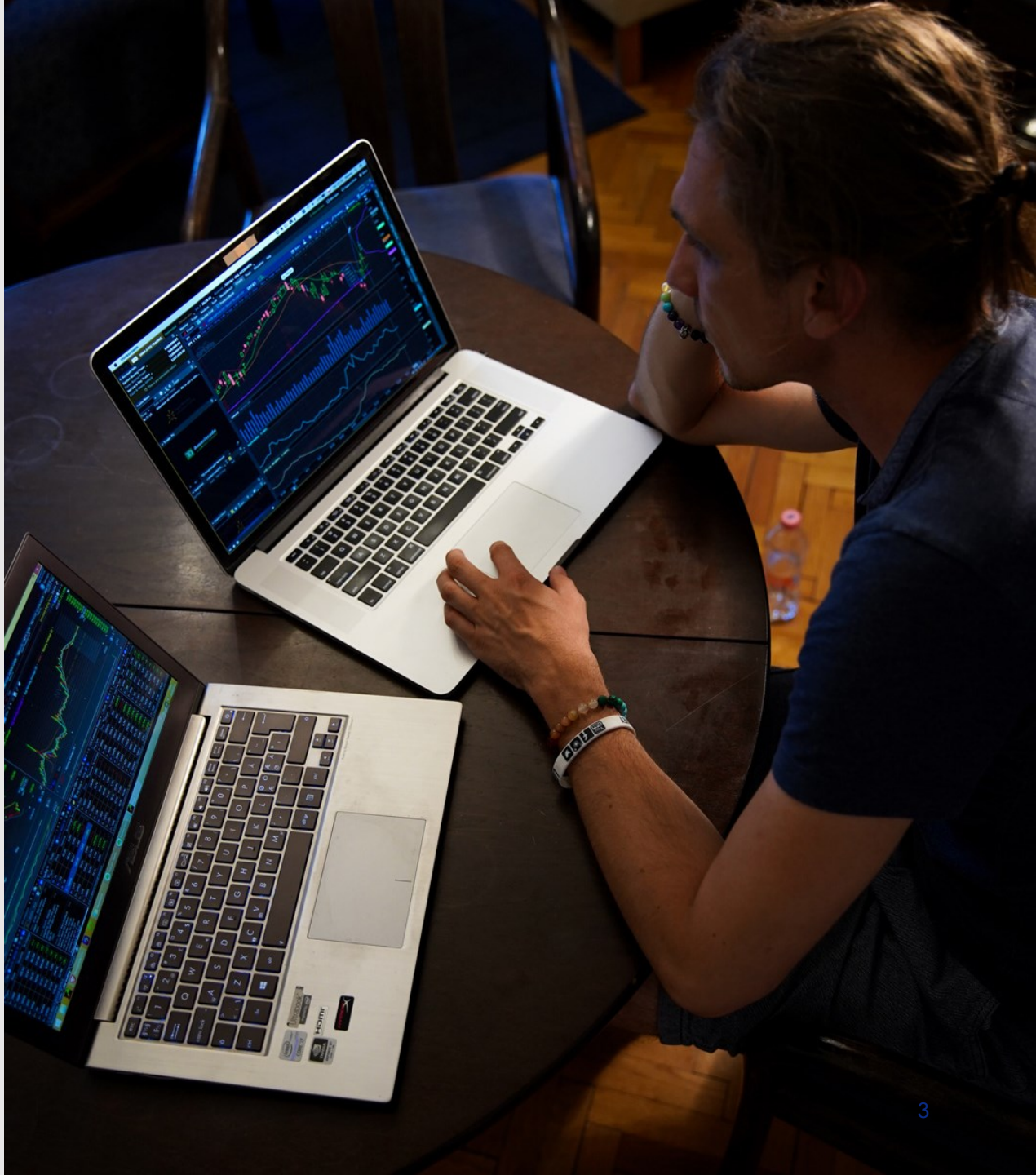
Agency for Data Supply and Infrastructure

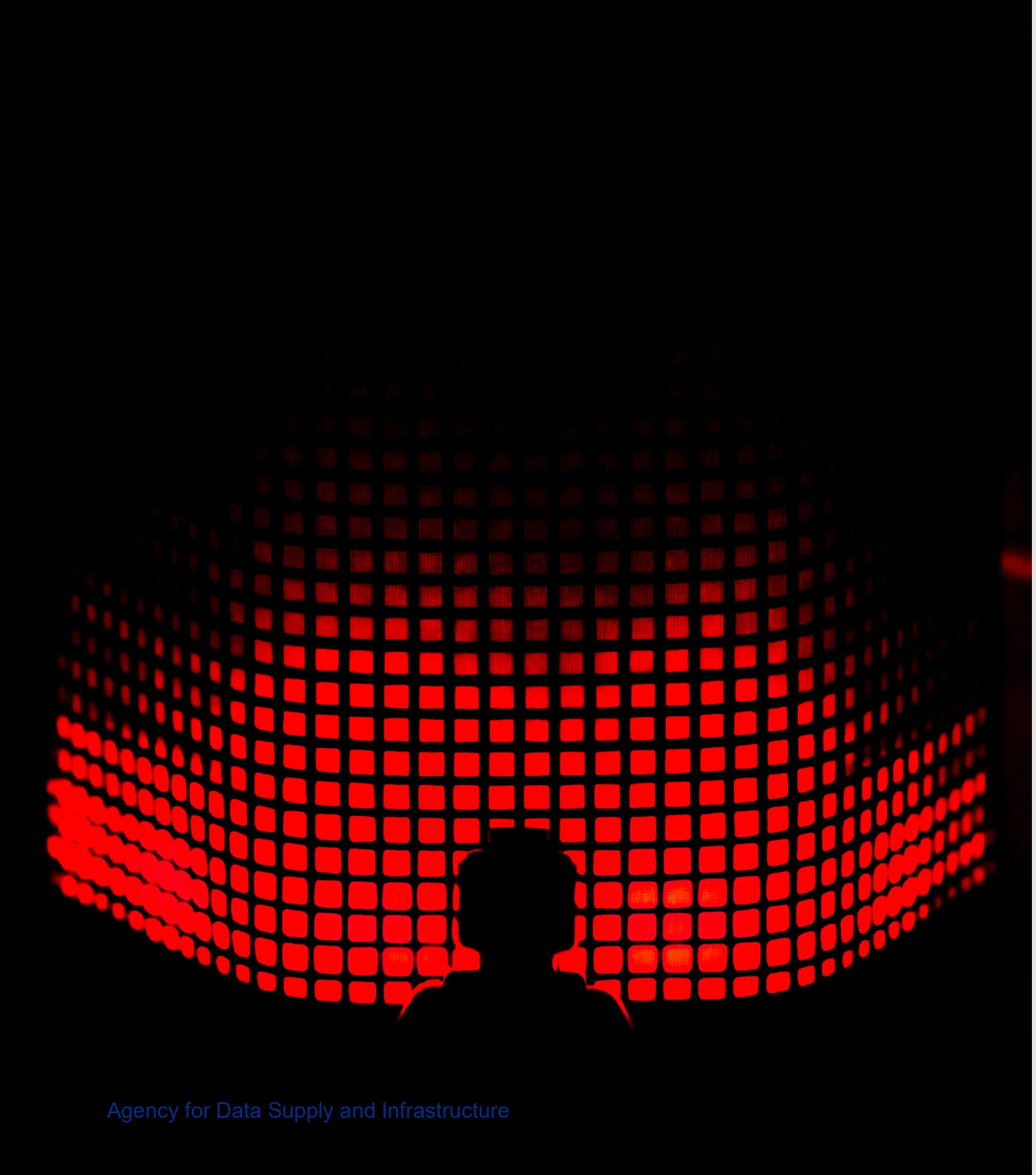
Kristian Evers, NKG General Assembly 2022-09-06

The Problem

Geodesists are not software developers

- Yet we write a bunch of mission critical software …
- … often in isolation by ourselves or a in small teams …
- ... without much concern for cyber security, ease of deployment and long-term maintainability
- … or interoperability with other software package





In other words

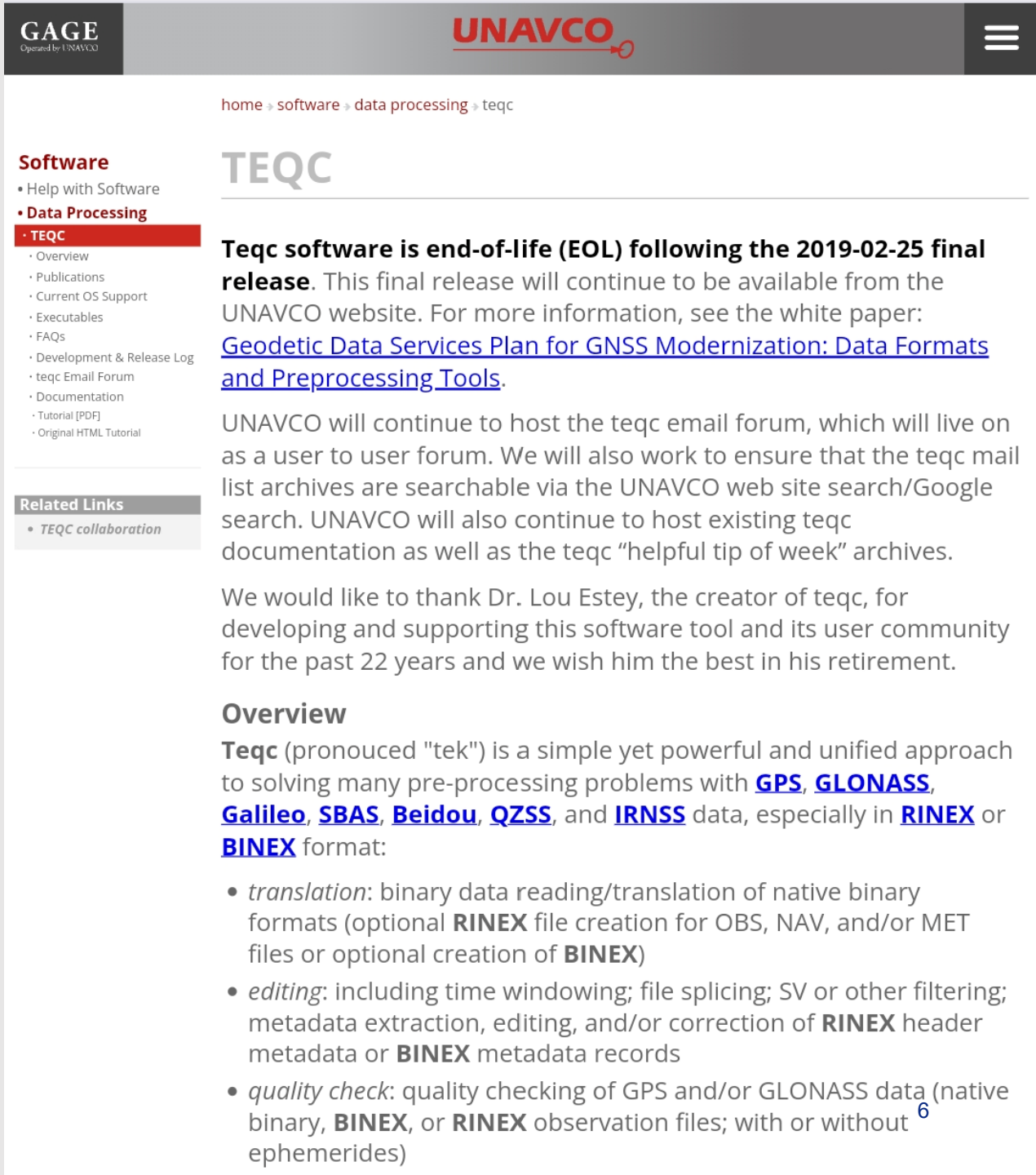
Important geodetic software is often

- outdated or perhaps even abandoned by the original developer
- hard to use in a production setting due to insufficient security
- using old standards for data exchange or none at all

The Bad Examples

TEQC

- Great software but now discontinued
- Single developer who retired
- Closed source – no community development
- No proper replacement – many people still using RINEX2
- RINEX3 alternatives exists but are in no way equivalent



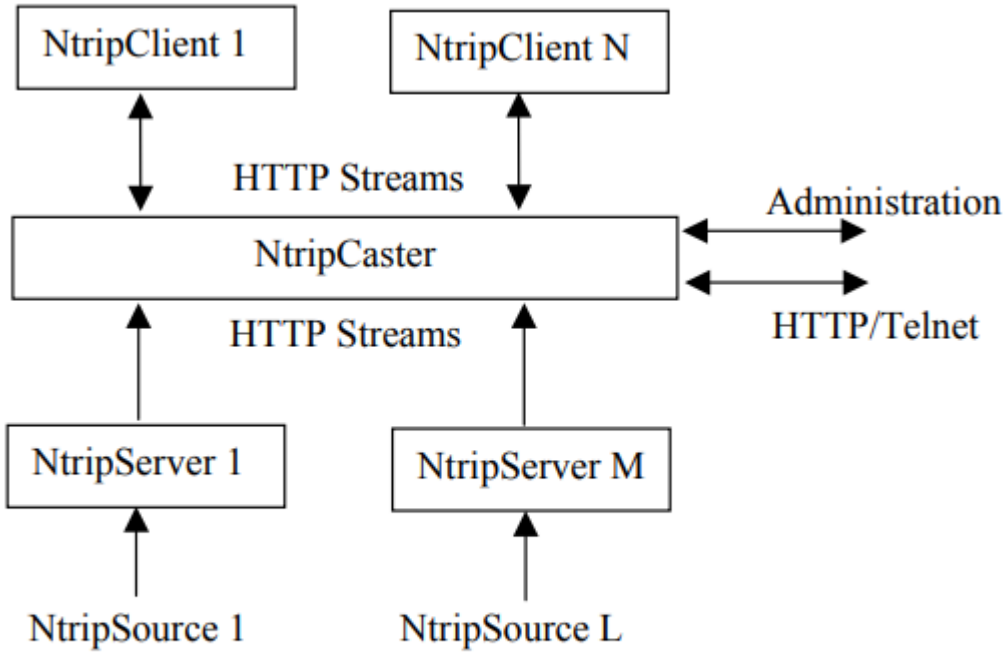


Figure 1. Ntrip Streaming System

Real-time GNSS streaming

- Version 1 of Ntrip protocol prevalent even though version 2 was released in 2011
- The root cause is seemingly that RTKLIB can’t consume Ntrip2 streams …
- … which make software depending on RTKLIB Ntrip1 only
- RTKLIB is an abandoned one-man project

The Good Examples

Astronomers figured it out

- In 2011 the astronomy community decided to join forces and collaborate
- Eleven years later, Astropy is a big organization funded by the NumFocus initiative
- Has about 30 core packages and 50 affiliated packages that all mesh together
- … and hundreds of contributors

As a community, … we are clearly doing something wrong if people repeatedly implement the same basic functions rather than building on what's already there.

What do we need to do differently? How can we make it easier to use a shared repository and shared namespace for all this?

PROJ

- Probably the most complete software for geodetic transformations
- Contributors from many geodetic agencies …
- … including several NKG member states

- Organized in OSGeo …
- … securing a good integration in many commonly used GIS tools …
- … as well as the infrastructure required when maintaining a popular software package

The Fix

Community development

- As a community we can learn a lot from the likes of Astropy and OSGeo
- The key is collaboration – not isolated development
- Open source software is the first step …
- … the next step is organization

A Geodetic Software Consortium

- A supporting organization that brings geodetic developers and software packages together

- Software like
  - Bernese
  - RTKLIB
  - BKG NtripCaster
  - Gipsy
  - Gravsoft
  - Where
  - …

- Perhaps based at the UN-GGRF Center of Excellence?

NKG Collaboration

- It works on a smaller scale too
- Plenty opportunities for collaboration within the NKG:
  - NKG Transformations
  - GNSS Analysis center
  - InSAR
  - Land uplift modelling
  - VLBI processing
  - …

Thanks for listening