Astronomic data over on-demand network circuits

Demonstrating e-VLBI over dynamic circuits

This demonstration uses pre-recorded data distributed across Europe, simulating telescopes sending data to the correlator, the DAS-3 grid. Signals from at least four telescopes, at a minimum data rate of 256 Mbit/s per telescope are correlated. Four data servers are accessible via the AutoBAHN-supported infrastructure in Europe or over the DCN of Internet2.

Figure 2 (below). Demonstration layout overview

The data servers mimic real telescopes streaming data and are currently based in Boston, Greece, Ireland, Croatia, Lisbon and Poland. The servers are connected through the local NREN and GÉANT2 with dynamic 1 Gbps circuits provisioned
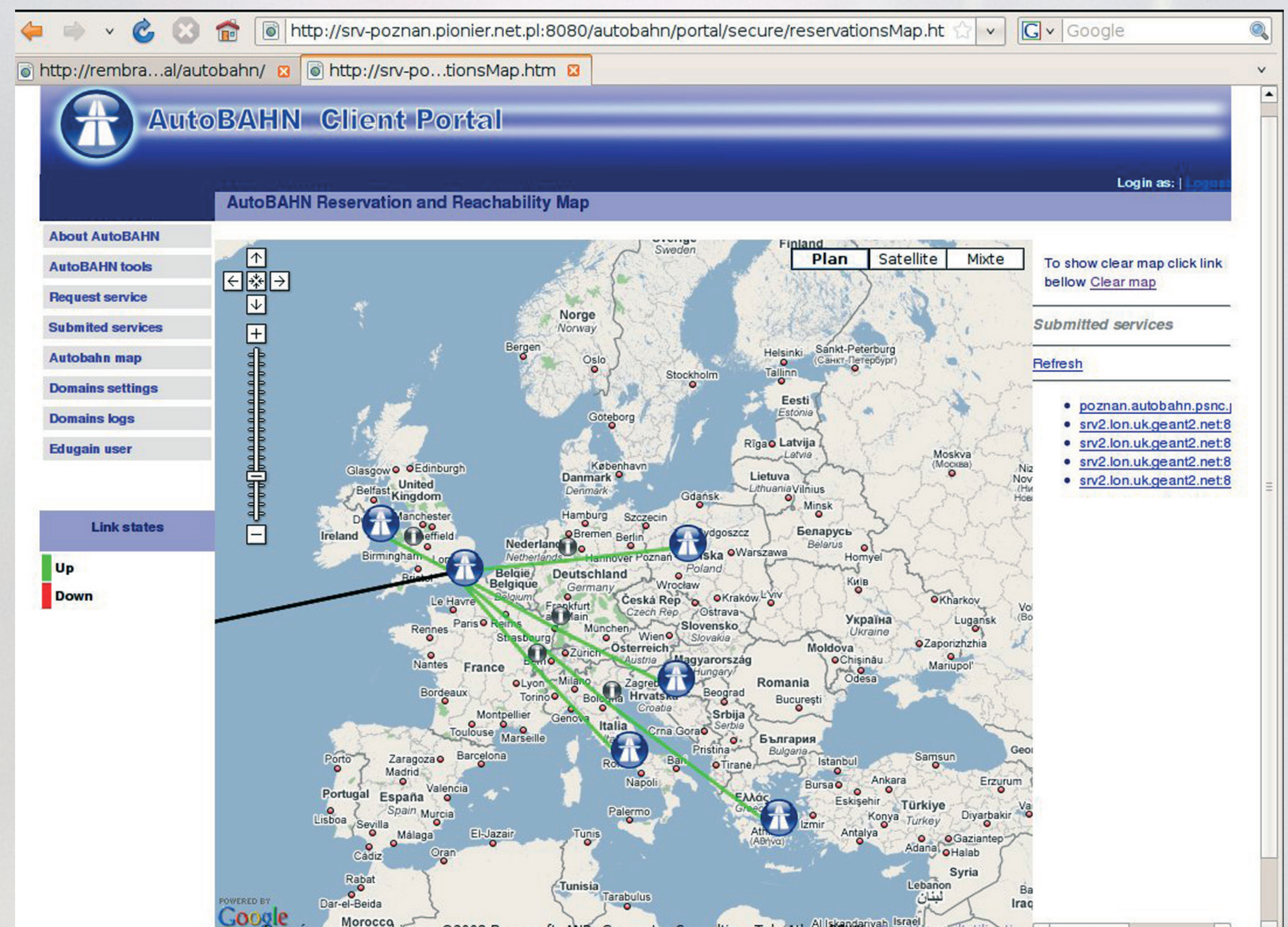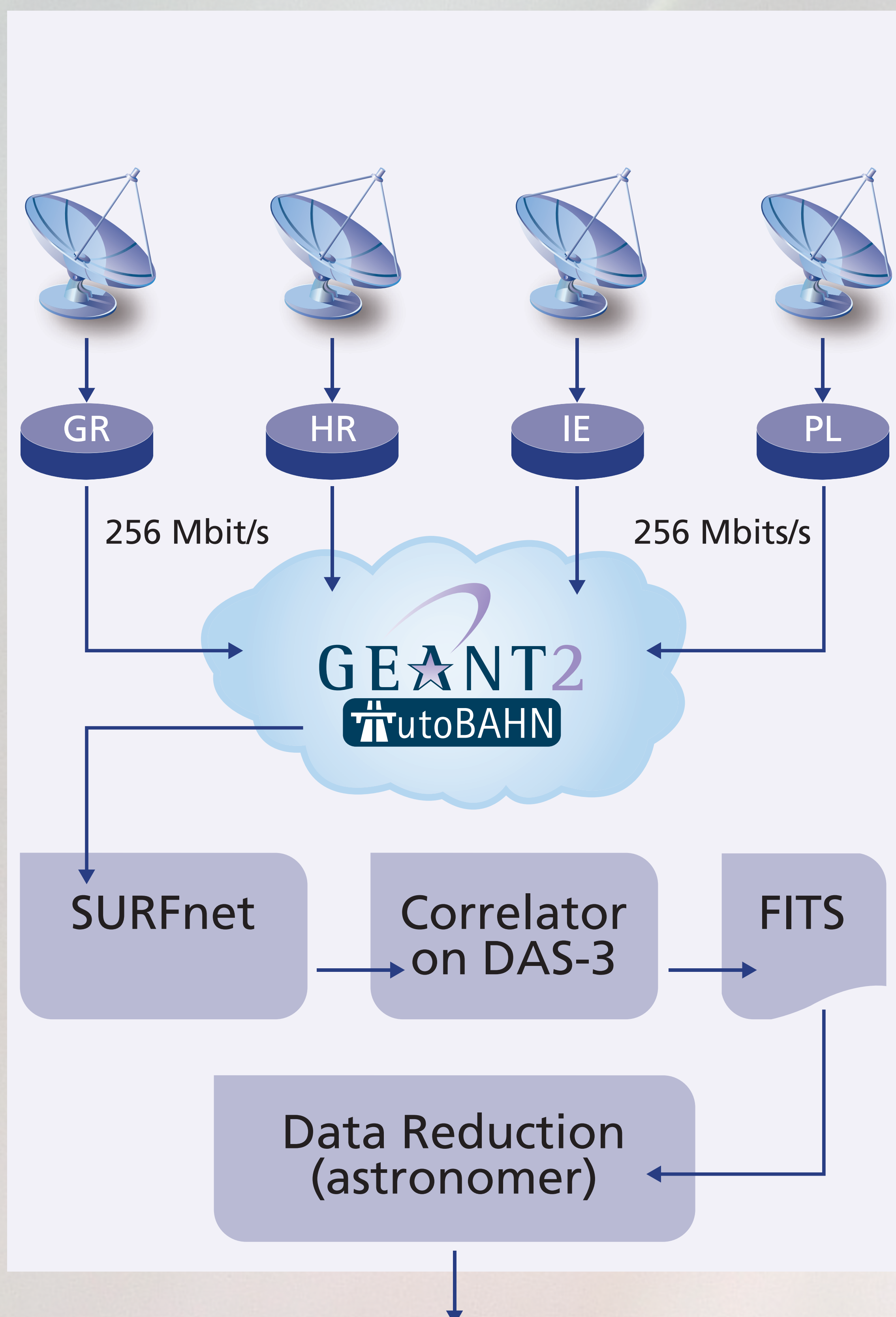

Figure 3. AautoBAHN client portal

by AutoBAHN. The circuits are delivered at the GÉANT2 point of presence in Amsterdam and then transported by SURFnet over a 10-Gbit/s link to one of the bridge nodes of DAS-3 (Figure 2). The DAS-3 cluster is used in this scenario as the software correlator. In principle, other grid clusters could also be used; this is one of the advantages of using a system for provisioning of dynamic circuits like AutoBAHN. Shortly before the software correlation starts, the circuits to carry the telescope data to the correlator from four different locations are dynamically configured through the AutoBAHN portal (Figure 3). While the correlation process is running, statistics about the correlation are presented. A fringe-display depicts the correlation function for one or more pairs of telescopes. This display shows a clearly identifiable peak when the telescopes move "on source", indicating that the observed source has been detected (Figure 2b).
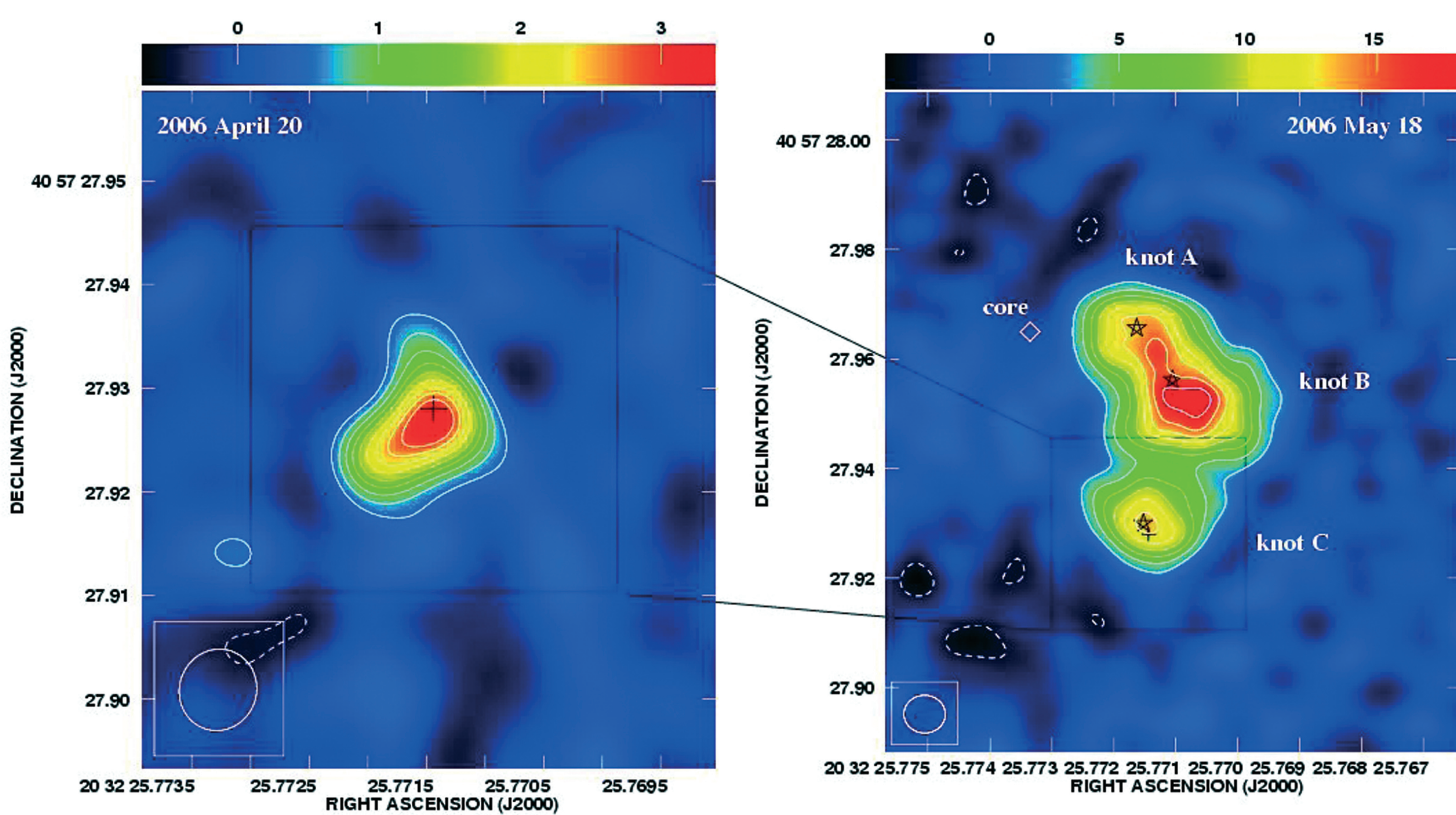
Example of what is produced by the correlator, running at DAS-3: Image of Cygnus X-3, an X-ray binary system, at 5 GHz in its quasi-quiescent state (left) and a few days after a major flare (right) obtained using e-VLBI (Tudose et al., 2007)

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