Multimessenger observations with the Seimei telescope and TriCCS

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Abstract

As presented last year, we had developed an automatic survey script, by which the Seimei telescope and TriCCS camera takes images of galaxies within the error region of a gravitational wave (GW) or neutrino (ν) event. This year, we have developed a system for automatically booting the survey script as soon as an important GW event occurs.

1. Introduction

The Seimei telescope at Okayama Observatory of Kyoto University has a 3.8 m primary mirror. It is the largest in Japan. It mounts a tricolor CMOS camera called TriCCS.

Since the GW or ν signal has a large uncertainty in direction, an optical survey for transients is inevitable to identify the optical counterpart. Since TriCCS has a shallower field of view compared to the typical uncertainty, it is unrealistic to scan the whole uncertainty region. Therefore, our approach is a galaxy-targeted survey, in which we observe galaxies within the region.

As presented in the last annual conference, **we had developed an automatic follow-up survey script** that downloads a galaxy list from the 'J-GEM planner' for a given gravitational wave event and observes the galaxies one by one (J-GEM: Japanese Collaboration for Gravitational-Wave Electro-Magnetic Follow-up). However, booting the survey script itself needed to be started by a human. **Developing a system for automatically booting the script** was future work for a quick follow-up.

2. Methods & Results

We have developed an automatic booting system for the automatic observation script, as shown in the Figure. It gets the recent GW alerts, judges their importance, and boots the automatic observation script.

Unfortunately, the automatic follow-up survey script has not been booted automatically yet, because there are no important GW event that satisfies our criterion. However, we checked that it worked if we weakened the threshold.

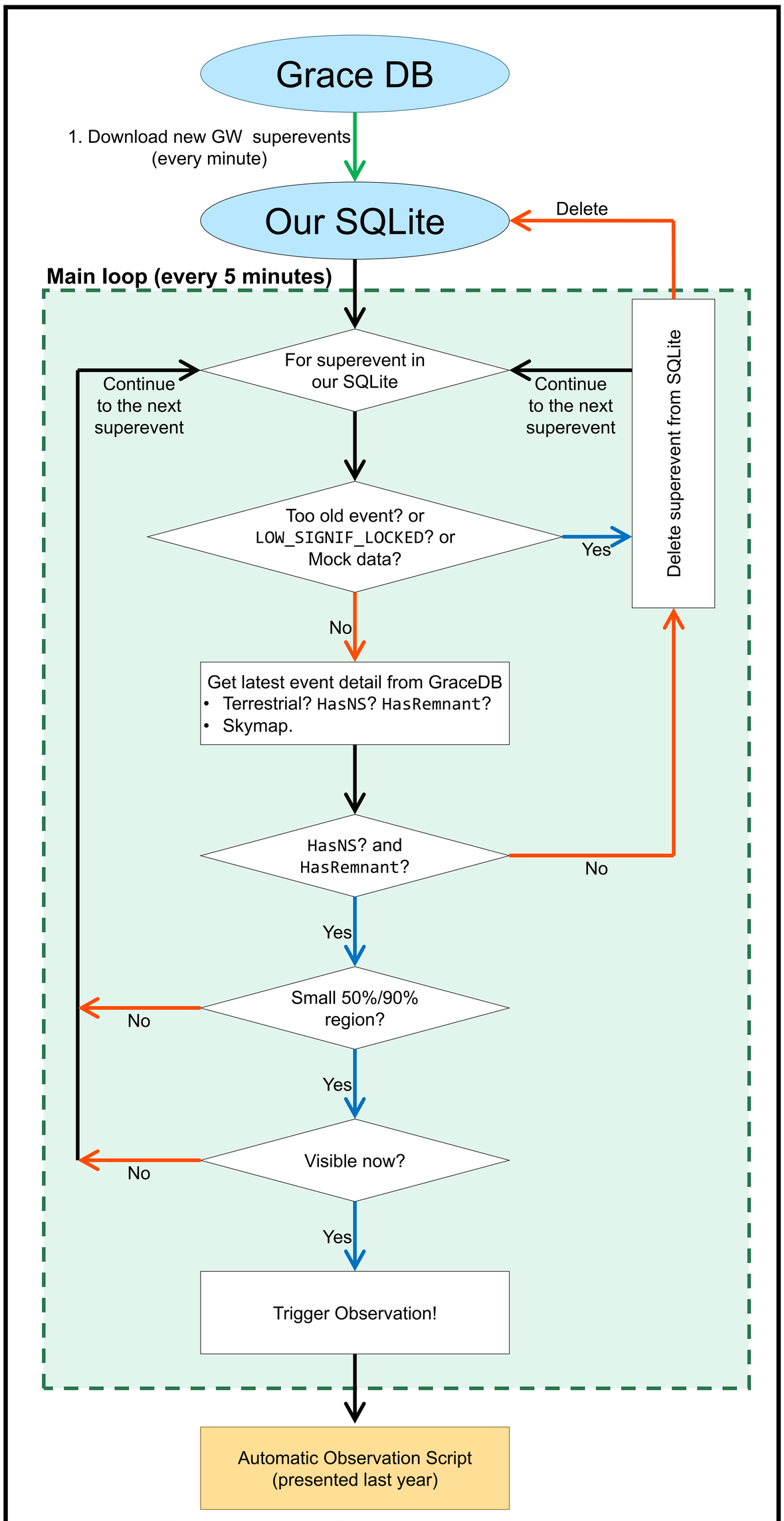

Figure: flowchart of our automatic booting system for the automatic follow-up survey script.

3. Recent News

Last Wednesday, there was a GW event S251112cm. Automatic booting of the follow-up survey script for the event is not done because it has a large error region. However, last Thursday and Friday, **we manually booted the script and managed to observe more than 150 galaxies**.