EGADS has been the test bed for gadolinium (Gd) related technologies. EGADS originally stands for Evaluating Gadolinium’s Action on Detector Systems. Among other tests, it was shown that:
- EGADS water purification system can achieve and maintain good water quality while keeping the Gd concentration constant.
- Gd has no adverse effects on detector components.
- Gd can be added/removed in an efficient/economical way.

The goal is efficient neutron tagging in water Cherenkov detectors:

Current Gd sulfate concentration is 0.02% Gd sulfate (50% of captures on Gd) but we plan to load it to 0.2% Gd sulfate (90% captures on Gd).

- EGADS is a 200-ton tank with 240 PMTs (224 are identical to the 50-cm Super-K ID PMTs and 16 are several types of photosensors for the Hyper-Kamiokande R&D project) and a compensation coil.
- The DAQ and front-end-electronics are based on Super-Kamiokande’s electronics → We can stand high event rates!!
- Most neutrinos are detected through inverse beta decay (IBD).
- Because of the double signal, prompt positron and delayed neutron capture, it is difficult for backgrounds to replicate IBD’s signature.
- Just a few IBD events within 10 seconds would be enough to detect a SN → even a small detector like EGADS can cover the galaxy.

**Remote EGADS shifts:**
- Every two hours.
- Water purification systems.
- Temperatures, PMT HVs, DAQ/HEIMDALL status, etc..
- Automated emails to experts.

**Can EGADS/HEIMDALL stand the high event rates of a close SN?**

*Test:* Flashing a light source for 10 seconds at different frequencies: can we reconstruct all those events? **Yes we can!**

<table>
<thead>
<tr>
<th>Number of flashes</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Successful</td>
</tr>
<tr>
<td>100</td>
<td>Successful</td>
</tr>
<tr>
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<td>Successful</td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>50,000</td>
<td>Successful</td>
</tr>
<tr>
<td>100,000</td>
<td>Successful</td>
</tr>
</tbody>
</table>

**HEIMDALL watches for galactic SNe and will give an instant, automatic and independent alert to the community.**

Currently, we share our status with Super-Kamiokande only. We are working to make this information available for everyone very soon!

**HEIMDALL**

**A Real Time Galactic Supernova Detector**

**Qabee front-end electronics:**
- Charge to time converter Based Electronics with Ethernet.
- Data transfer capability enhanced by using Ethernet.
- Capability for higher event rates (~ few MHz).
- All hits can be collected.

**Remote EGADS shifts:**
- Every two hours.
- Water purification systems.
- Temperatures, PMT HVs, DAQ/HEIMDALL status, etc..
- Automated emails to experts.