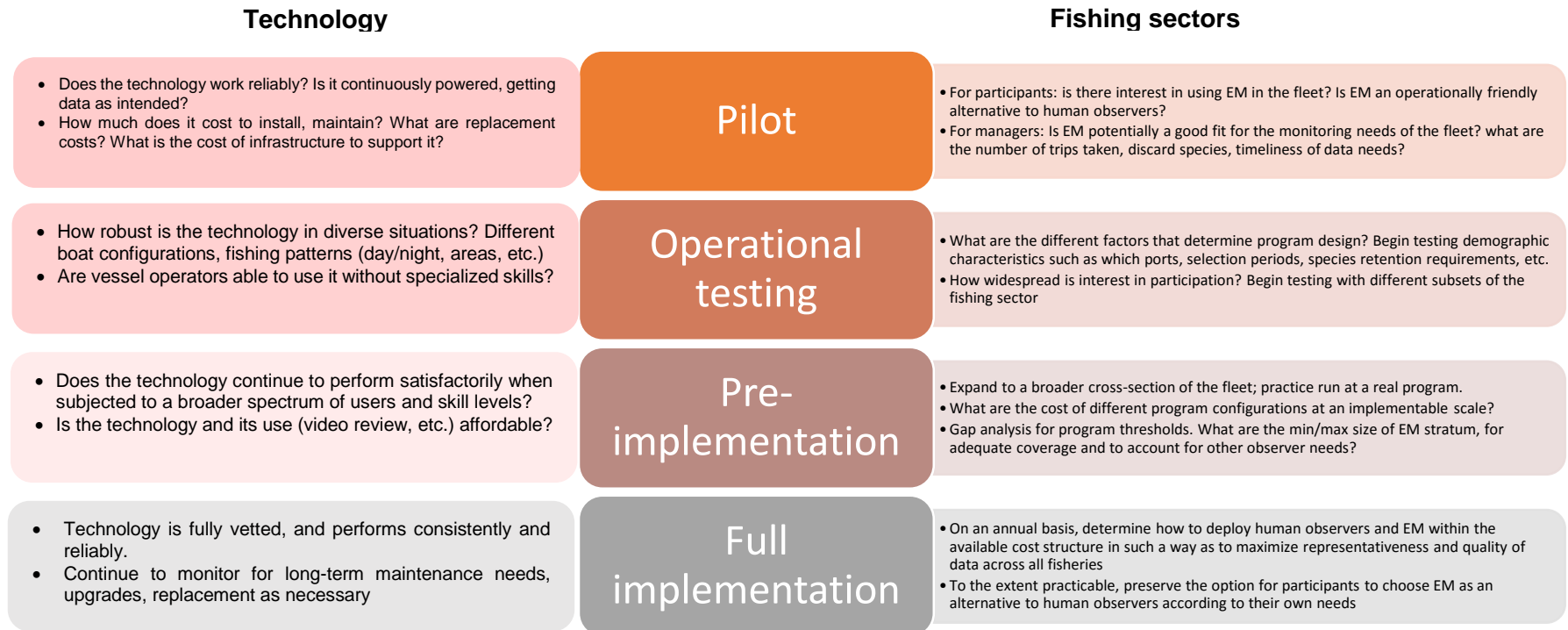


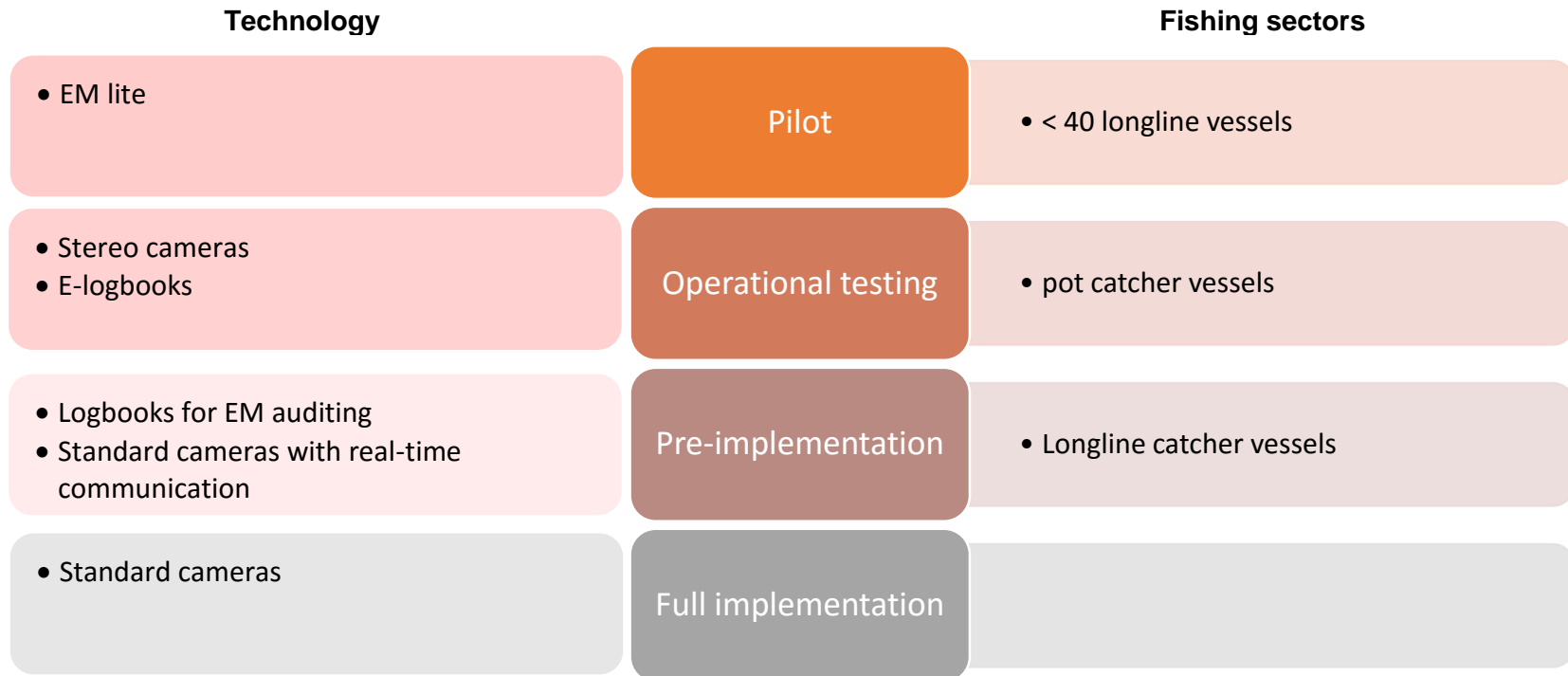
## EM development process

This analysis evaluates changes to the regulations that would allow EM to become a viable tool for monitoring in the partial coverage fixed gear groundfish and halibut fisheries. In order to ensure that the Council and NMFS can rely on the monitoring data resulting from the use of EM, however, it is necessary that a particular EM technology, or the fishery into which it is deployed, be developed through a series of steps. This process applies both to different fishery sectors interested in becoming eligible for EM, as well as for new EM technology that might be deployed in the fisheries. At each stage, in order to determine an appropriate scale of EM selection pool as part of the Annual Deployment Process, the Council will need to consider what is known about the reliability of the technology, its suitability for the different fishing patterns or vessel configurations of the subject fleet, and the ability of vessel operators to appropriately interact with the technology onboard. This developmental process has been illustrated below.

**Figure 1 EM development process**



**Figure 2** Progress on development of EM projects in Alaska



**Table 1 Stages of development – Dan Falvey**

EM Program Stage	Distinguishing Characteristic	EM Hardware	Vessel responsibilities	Review Software	Management pathway
Mature	<ul style="list-style-type: none"> <li>•In Use</li> </ul>	<ul style="list-style-type: none"> <li>•Cost effective systems commercially available</li> </ul>	<ul style="list-style-type: none"> <li>•VMP feedback process operational</li> </ul>	<ul style="list-style-type: none"> <li>•Cost effective services/software commercially available</li> </ul>	<ul style="list-style-type: none"> <li>•Data routinely used to meet management objectives</li> </ul>
Pre-implementation	<ul style="list-style-type: none"> <li>•Finalize protocols and services</li> </ul>	<ul style="list-style-type: none"> <li>•Standardized Systems commercially available</li> <li>•Initial and long term costs evaluated/finalized</li> </ul>	<ul style="list-style-type: none"> <li>•VMP's independently evaluated</li> <li>•Field support service models/costs finalized</li> </ul>	<ul style="list-style-type: none"> <li>•Initial and long term data review protocols and costs independently finalized</li> </ul>	<ul style="list-style-type: none"> <li>•Protocols to incorporate data finalized</li> </ul>
Operational testing	<ul style="list-style-type: none"> <li>•Independent evaluation under operational conditions</li> </ul>	<ul style="list-style-type: none"> <li>•Standardized systems systematically deployed on diverse vessel configurations</li> <li>•System performance independently evaluated</li> <li>•No onboard technical support</li> </ul>	<ul style="list-style-type: none"> <li>•Vessel compatibility demonstrated</li> <li>•Crew responsibilities defined</li> <li>•VMP's developed to accommodate individual vessel configurations</li> <li>•Data quality independently evaluated</li> <li>•Field support service models/costs under development</li> </ul>	<ul style="list-style-type: none"> <li>•Standardized review software ready for independent evaluation</li> <li>•Data review protocols defined and ready for independent evaluation</li> </ul>	<ul style="list-style-type: none"> <li>•Management objectives clearly defined and approved by Council</li> <li>•Evaluation criteria defined</li> <li>•Protocols for incorporating data under development</li> </ul>
Pilot testing	<ul style="list-style-type: none"> <li>•Standardized approaches</li> </ul>	<ul style="list-style-type: none"> <li>•System components initially defined</li> <li>•Standardized systems deployed on volunteer vessels</li> <li>•Limited onboard technical support</li> </ul>	<ul style="list-style-type: none"> <li>•Initial crew responsibilities defined</li> </ul>	<ul style="list-style-type: none"> <li>•Standardized review software ready for initial evaluation</li> <li>•Initial data review protocols defined</li> </ul>	<ul style="list-style-type: none"> <li>•Initial management objectives defined</li> <li>•Potential management pathways identified</li> </ul>
Proof of Concept	<ul style="list-style-type: none"> <li>•Adaptive development</li> </ul>	<ul style="list-style-type: none"> <li>•Custom construction of a limited number of systems.</li> <li>•Multiple system upgrades/year</li> <li>•Limited deployment with intensive technical support</li> </ul>	<ul style="list-style-type: none"> <li>•Vessel operational compatibility unknown</li> <li>•Minimal or Informal crew responsibilities</li> <li>•Possible onboard technician requirement</li> </ul>	<ul style="list-style-type: none"> <li>•Under development</li> <li>•Multiple upgrades/yr.</li> </ul>	<ul style="list-style-type: none"> <li>•Wait and see results</li> </ul>

**Table 2 Status of various EM programs – Dan Falvey**

<b>EM Approach</b>	<b>Comments</b>	<b>EM Hardware</b>	<b>Vessel responsibilities</b>	<b>Review Software</b>	<b>Management pathway</b>
Logbook Audit	Used in Canada, & U. S. West & East Coast	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>
Minor species catch estimation (Avg. Weight)	Used in Canada	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>
Length of critical species via measuring boards	Used in Canada	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>	<b>Mature</b>
Catch estimation of all discards (Avg. Weight)	Pre-implementation in Alaska	<b>Mature</b>	<b>Pre-implementation</b>	<b>Mature</b>	<b>Pre-implementation</b>
Stereo Cam with chute	Testing in A 80 fleet	<b>Pilot testing</b>	<b>Pilot testing</b>	<b>Proof of Concept</b>	<b>Pilot testing</b>
Stereo Cam no chute	Limited testing in partial coverage HAL fleet	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>
Auto species identification and video review	Limited testing in processing plants	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>
Dataloggers	Limited field testing in AK, WA	<b>Operational testing</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>
Finished data-set automatic transmission		<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>	<b>Proof of Concept</b>