

# **Summary of Bell Ringer Activity**

2017

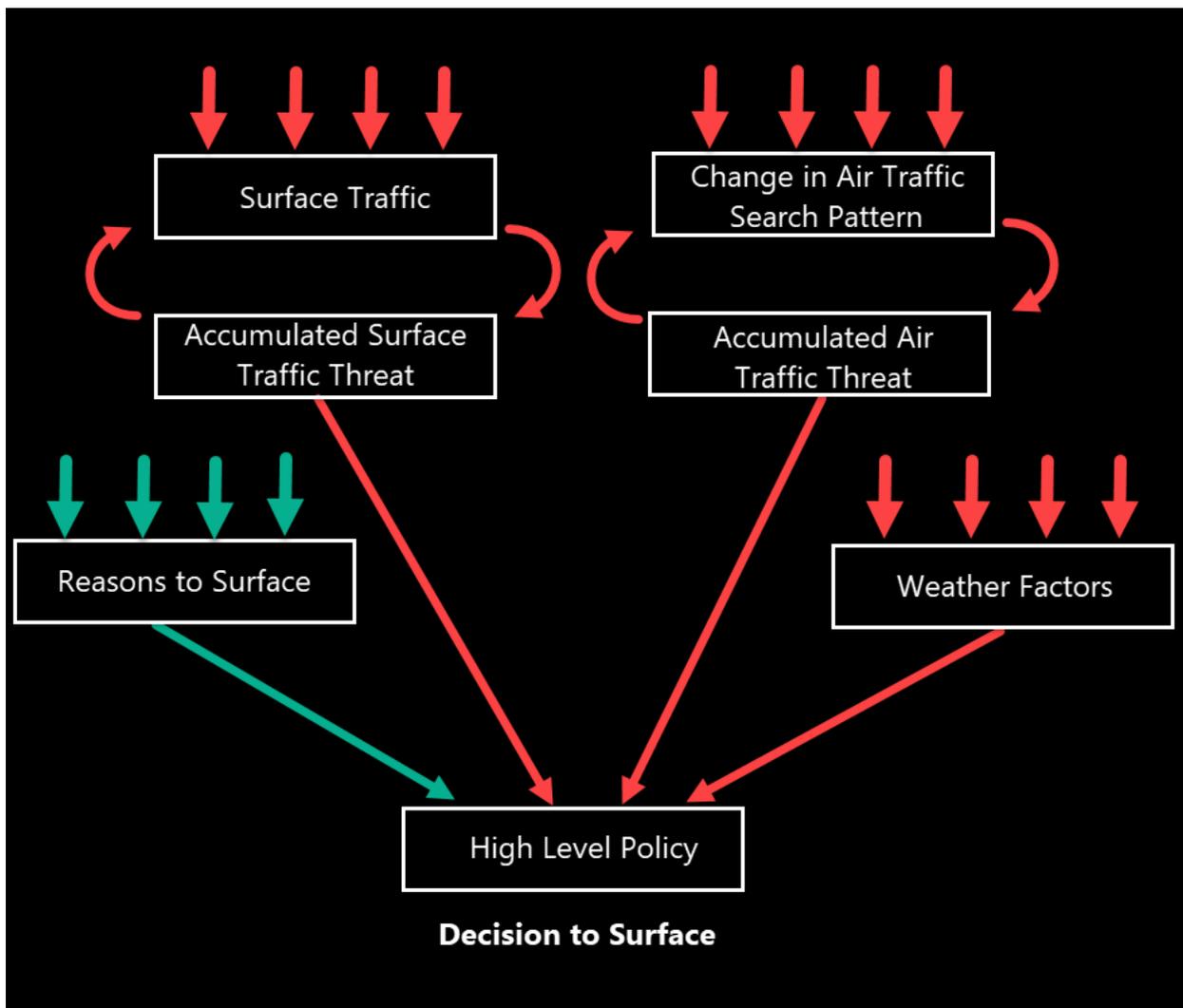
## **Objective:**

**This series of videos provides a summary of developments that led to completed AI-based decision-making policy that can be executed by a machine. The process is documented from concept to low level information collection.**

## Bell Ringer Overview of Complete Project (6 min 20 second video) 12/28/2017

This overview video provides an overview of the complete project development process, from the time the problem was identified through a series of steps that resulted in a complete operational policy suitable for installation in an underwater vehicle with support for after-mission reviews. This video references several other videos that show the developments of sub-topics that feed the top level decision.

<http://www.compsim.com/Movies2018/BellRingerOverview/BellRingerOverview.html>



## RingBell1 Policy (original KEEL high level design)

This video shows the actual development process (14 min 24 sec) typing errors included to create the high level decision as initially described to us.

<http://www.compsim.com/Movies2018/RingBell1/RingBell1.html>

## Rendering of RingBell1 High Level Policy

One of the characteristics of KEEL Technology is the ability to create “interactive renderings of an operational policy”. The link below provides a link to the policy created in the video above. This concept is in support of “explainable AI”.

<http://www.compsim.com/DemoVideos/HShowBellRinger1/HShowBellRinger1.html>

## Test High Level Ring Bell Policy (Initial Simulator)

As the project was developed we were asked how difficult it would be to demonstrate the policy in a simulator. The simulator for this initial project was created and posted on the Compsim website.

<http://www.compsim.com/DemoVideos/HTestRingBell1/HTestRingBell1.html>

A second video was created to show how easy it was to integrate the KEEL policy in a simulator to test the original policy (12 min 56 sec)

<http://www.compsim.com/Movies2018/RingBell1Simulator/RingBell1Simulator.html>

## Bell Ringer Surface Traffic Policy

After the initial policy was developed it was determined that lower level decisions were needed. The first was a policy for evaluating surface traffic in order to generate a “surface traffic risk factor” that could be used by the higher level decision. The link below is the rendering of the policy that was developed.

<http://www.compsim.com/DemoVideos/HShowBellRingerSurfaceTraffic/HShowBellRingerSurfaceTraffic.html>

## **Simulating the Bell Ringer Surface Traffic Policy**

A Surface Traffic Simulator was created to test the surface traffic policy. This was a Windows executable application rather than a web-based demonstration, because it was used to interact with the KEEL Toolkit policy development platform. For this reason, we just have a video showing how the policy was developed and refined:

The third video shows Surface Traffic model in KEEL with the simulator - 8 min 12 sec

<http://www.compsim.com/DemoVideos/HSurfaceTraffic1/HSurfaceTraffic1.html>

## **Bell Ringer Weather Policy**

A “weather risk factor” that could be used by the higher level decision was needed. The link below is the rendering of the policy that was developed.

<http://www.compsim.com/DemoVideos/HShowBellRingerWeather/HShowBellRingerWeather.html>

## **Influence Diagrams embedded in pdf**

One of the capabilities of KEEL “tools” is to automatically generate interactive influence diagrams of KEEL-based policies.

<http://www.compsim.com/Papers2018/BellRingerProject-Influence Diagrams.pdf>

## **Summary:**

This process highlights that operational decisions are seldom the result of a single information fusion process. It suggests that operational policies are a combination of cognitive processes that lead up to a decision or action. This is an example of a development process. When integrated into the final solution the container application IF THEN ELSE code will schedule the lower level information fusion functions into abstracted collection values that are ultimately used to drive the final decision.