NOVA SYSTEMS INSIGHTS

AUTONOMOUS SYSTEMS: SOLVING THE RIGHT PROBLEM

***Jon Scortino**, Mining Sector Lead -Co Lead Author*

***Steve Ashfield**, Senior Technical Adviser -Co Lead Author*

Business today is fast paced and busier than ever. The impetus to provide high quality products and services in short time frames and at competitive pricing mounts constantly.

"I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail." – Abraham Maslow, pre-eminent psychologist

Businesses operating in this 'pressure cooker' environment often find themselves turning to technology to provide solutions that will assist them in achieving more efficient production, safety improvement, and cost reduction wins.

They grapple with the relentless advance of technologies and techniques, including big data, **digital twin** and **augmented reality** (AR), as well as the impact of **digitalisation on safety**, **asset management** and the expectation that all of these are needed *now*.

This has seen the birth of a new 'industry' in autonomous systems, with vehicles (ground and air) at the tip of the spear. Meanwhile, industrial automation programs are becoming more and more prevalent, ranging from relatively simple machinery automation right through to 'smart' autonomous systems that apply machine learning and advanced robotics techniques.

Large scale operations are heavily focused on finding ways to balance the supply/demand equation, such as in **autonomous mining**, while small and medium enterprises try to efficiently achieve business growth. However, as industries grow and develop, and new solutions become available, more and more businesses are being swayed by the tendency to see the "shiny new widget" as a solution to the challenges being faced.

Often by the time a business gets to this stage, the pressure is so intense that there is a desperate need for a solution to be created. Experience has shown that the best salespeople in the world will work to convince you that *you* have a problem and *they* have the solution. In the race to create change through quick wins, widgets are deployed to provide "improvements".

Consider this non-hypothetical scenario: a business adopts autonomous technology at considerable cost to solve a safety or efficiency problem, when a relatively inexpensive set of process changes might have been equally effective.

So, what is the real problem in this situation?

Is it a lack of autonomous technology? Are your competitors adopting autonomous technology and you feel like you're being left behind? Or is it something deeper, or even *simpler*?

Before you jump into buying a solution that someone else has convinced you will solve a problem, that they've also convinced you that you have, we propose that you:

… understand your needs before you consider what technology to adopt.

Autonomy may well be the solution – or part of the solution – that your business needs. For those businesses who do choose to go down the autonomous technology path it is critical that you:

- Do the 'front end' work first: articulate your needs and how your newly automated business is going to operate at end-state; and
- Understand the requirements that flow from those needs.

Completing these tasks at the beginning will shape the overall solution and help you to validate that it matches your endorsed needs. Importantly, this approach will save you the significant expense of having to unwind newly installed operations that don't provide an effective solution.

Experience gained across a range of industries, including aerospace, mining, transport, power, water and oil & gas indicates that a given enterprise problem space is typically comprised of a dozen or more subordinate issues. This is further complicated by the fact that resolving those underlying issues *individually* won't necessarily 'fix' the problem space. In other words, an *integrated solution* is required.

Integration is almost always misunderstood. This understates the problem (or problems) to be solved, and in particular the fact that the problem space is often a system with emergent properties greater than the sum of its parts. Thus, a systems approach will consider overall performance, structures, patterns and cycles in the

problem space rather than specific events or elements. By extension, a focus on the entire system leads to the identification of solutions that address as many issues as possible in the overall system and leads their emergent or joint solving of an overall issue.

A systems thinking approach defines and scopes the holistic operational concept, operational and technical requirements, and the other systems and stakeholders that the solution program needs to interoperate with. Without such an approach, you are limited to improvements only, and the right problems will most likely remain unsolved.

*The above Insight has been published from Nova Systems Energy & Resources program. For further information regarding **Autonomous Systems**, contact Tim Anderson, Program Manager – Energy & Resources* tim.anderson@novasystems.com

