Abstract. Having identified that simulation can offer significant benefits for training applications, it can often be difficult to determine detailed simulation requirements and develop a rigorous business case to support acquisition. At SimTecT 2012, the Australian Defence Simulation Office described the Simulation Needs Analysis Guide for Training (SNAG-T). The SNAG-T provides a simple, structured and supportive guide for users analysing simulation needs and requirements for training applications. The SNAG-T process has now been implemented as an interactive computer-based tool, which guides the user through a detailed, logical process or, alternatively, allows the user to rapidly find information relevant to their situation. This paper describes the development of the SNAG-T process and its implementation as a computer-based tool.

1. INTRODUCTION

The Australian Defence Simulation Office's (ADSO's) principal roles are policy direction, collaboration, and coordination of simulation activities across Defence. ADSO promotes the development of approaches to gaining and sustaining knowledge via simulation for Defence to make the best use of this technology wherever it can enhance capabilities, save resources and reduce risk. Training is one of the simulation application areas within Defence, both for individuals, for example flight training devices, and collective, such as the use of Command Post simulations.

At SIMTECT 2012 ADSO presented a paper on a process under development called the Simulation Needs Analysis Guide for Training (SNAG-T). The purpose of the SNAG-T was to create a simple, structured and supportive guide for Defence users seeking to use simulation to meet a training need. That paper described the process in its developmental form. Since then the process has been fully developed into a usable guide and incorporated into an interactive computer based tool.

2. WHAT IS THE SNAG-T

In Defence the use of simulation for training could occur for the following reasons: acquisition of a new capability with a new training need; an existing capability with a new training need; or an existing capability with an existing training need, seeking more efficient of effective training methods. The SNAG-T is a structured process that supports the identification, analysis and Value for Money determination of simulation options to meet a training need. It is a scalable process that provides a repeatable and approved method for determining simulation requirements and conducting analysis to support simulation acquisition business documents. SNAG-T was developed as a ‘means to an end’, supporting the development of higher quality acquisition business documents and subsequent business decisions. Many acquisition business documents are required throughout the Capability Systems Life Cycle (CSLC); therefore SNAG-T supports documents such as:

- Simulation Options Brief;
- Feasibility Report including Options Analysis;
- Initial Business Case;
- Capability Submission;
- Simulation Business Case; and
- Project/Contract documents including a Functional Performance Specification.

2.1 The Main SNAG-T Steps

The process has five main steps: Context Analysis; Identify Options; SNAG-T Kernel; Value for Money Assessment; and Business Documents. The main steps are briefly explained here and the process diagram is shown in figure 1.

1. Context Analysis – Identification of key outputs required for the simulation business document; assess the level of detail required of the analysis; initial assessment of time and resources; task and timeline planning.

2. Identify Options – Identification of the workplace need; establishment of the minimum training requirements and training tasks; identification of simulation and non-simulation options through market research.

3. SNAG-T Kernel – Analysis of simulation specific topics to determine the feasibility or Cost/Benefit of each simulation option recommended in the Identify Options step.

4. Value for Money (VFM) Assessment – Comparison of Cost/Benefit assessments for the individual simulation and non-simulation options through market research.

5. Business Documents – Use analysis generated through the SNAG-T process to develop the required simulation acquisition business document.
Within each of the five main steps there are a number of sub-steps which can be completed to various levels of detail dependant on the task and when the analysis is conducted within the CSLC. It is important to note that step 3 – SNAG-T Kernel has its own 13 steps which each have sub steps. The SNAG-T Kernel is used to analyse individual simulation options identified in step 2 – Identify Options. This means that step three is repeated for each simulation option and the results are compared in step four.

3. DEVELOPMENT OF THE SNAG-T

The development of the SNAG-T process began with a literature review of current Defence policies, procedures and doctrine which impacted the procurement of simulation within the training application area. A straw man process of the major steps was then constructed. From the straw man the minor steps of the process were expanded and made into flow charts. Flow charts were chosen as the method to map the process due to their standard symbology and a preference to a questions based guide.

By using questions in the flowcharts the process users would be able to bypass information they didn’t require or steps which they had completed external to the SNAG-T process. For example, if a project manager had already completed an analysis of the training need then the user of the SNAG-T would not need to redo this work – they could simply access the training analysis and extract the relevant information.

As the flow charts were developed each procedure box and read/write/document box was given a unique identifier. This allowed for later procedural steps to call back on the analysis conducted earlier in the process. The identifiers were then correlated to an external document which held expanded information about each procedure. This expanded information later became the basis for the on-screen content in the interactive tool.

Throughout this development phase a range of stakeholders were engaged to determine their requirements for a SNAG-T process. The stakeholder group was used to shape the process during development and later became the basis for beta testing of the computer-based tool.

Once the draft process had been completed it was then evaluated by a contracted external training/simulation expert. This evaluation provided some important feedback which was incorporated into the SNAG-T. The largest change identified in the review was the requirement to analyse multiple simulation options and compare them. Initially the SNAG-T was developed with the view of analysing or developing a single simulation option for meeting a specific training need. However, through the review it was acknowledged that there may be multiple solutions for meeting the training need and that each should be analysed individually and later compared. To achieve this, a number of structural changes were made. The original process was book ended by a couple of new steps which allowed the user to define the problem and then conduct analysis of multiple solutions. The added steps were the Context Analysis and the Value for Money Assessment.

Another key change was movement and expansion of the Identify Options step. Inline with the change for analysis of multiple options, the Identify Options step was separated from the main analysis. It was then expanded to define the minimum training requirements and their linkages to simulation requirements. This allowed the Identify Options step to elicit the baseline requirements and performance measures for the training need. These could then be used to evaluate each option during the SNAG-T kernel.
One of the key challenges in developing the SNAG-T was creating an enterprise level process that could be used throughout the CSLC by personnel with highly variable simulation expertise. This challenge heavily influenced how the SNAG-T was implemented.

4. IMPLEMENTATION OF THE SNAG-T

Prior to implementation the SNAG-T existed as a large number of flowcharts, a volume of supporting documentation and procedures, and a couple of templates for storing analysis. There were a number of steps required for the implementation of SNAG-T, such as: choosing a publishing format, conversion of the flow charts and content into an interactive tool, and deployment onto the Defence Restricted Network (DRN). This section of the paper will discuss the implementation of the SNAG-T as an interactive computer-based tool.

4.1 Choosing a publishing format

With the SNAG-T process nearing completion it was evident that it contained various levels of information, not all of which was required by all users of the process. This was due to the challenge mentioned earlier of an enterprise process to support all phases of the CSLC and varying levels of simulation expertise. As a result, serious consideration was given to the publishing format for the SNAG-T. The objectives of the publishing format were to reduce information overload on the user by only revealing the information they require and allowing the process to flow smoothly.

Initially, the process was planned as a guide style document; however it became evident that writing a multi level process in hard copy format is difficult and makes process flow disjointed. This is due to the reader either being exposed to all the information at once or they flick back and forth through the document to the relevant information that they need. However, documents have certain advantages such as low overhead and cost, low requirement for technical expertise to implement and maintain, and less requirement for the user to become accustomed to a user interface.

The limitations of a document lead to the consideration of an interactive computer-based publishing format. The benefits of using an interactive format are the use of a standard interface throughout, expandable text, simple book marking and fast searching. However the limitations of the computer-based interface were development cost, development time, technical difficulty, additional project management and maintenance overhead. In the end, the benefits of an interactive computer based format were assessed as very important to the user experience and it was selected over the document format.

4.2 Converting SNAG-T into an interactive tool

As mentioned above the objectives of the interactive tool were to provide a consistent interface with readily accessible book marking and searching. Additionally, the tool needed to reveal information in ‘bite-sized’ pieces so the user was not over whelmed with the information or the process. It was decided that a general e-learning look and feel would be the best method of encapsulating these objectives.

The conversion of SNAG-T to an interactive computer-based tool began with the creation of a mock-up of a possible user interface and ‘look and feel’. This mock up was created in-house using MS PowerPoint and introduced the concept of a persistent tool bar across the top and bookmarks bar down the left-hand side. It included pop-up text boxes for detailed explanations and used forward and back buttons in the lower part of the screen to allow the user to progress through the process. A screen shot of the original mock-up can be seen at figure 2. This mock-up was then used to guide a Statement of Work for tendering.

![Figure 2: Original SNAG-T mock-up screen shot](image)

The requirements for implementation as an interactive tool were:

- Easily hosted on the Defence Restricted Network (DRN) 1,2
- Consistent interface throughout,
- Content updateable by the Commonwealth, and
- Content non-modifiable by the user.

The work to implement the SNAG-T was to be completed in 4 phases:

1. Preliminary design, development and scheduling.
2. Development and production of a beta version for Commonwealth review and testing.
3. Commonwealth internal beta testing of the SNAG-T tool.
4. Production of the final version incorporating beta testing changes.

The SNAG-T was built in an application commonly used to develop web help interfaces. The application only required minimal technical skill for maintaining the SNAG-T, which made the SNAG-T easy to implement and modify, and was cheap to acquire.

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1 Must not be an executable file.
2 Able to be viewed using tools within the standard operating environment, i.e. MS Office, Adobe Reader, or Internet Explorer.
Additionally, the web help output by was able to be deployed to the DRN using existing tools within the standard operating environment.

The web help output meant that the SNAG-T could be implemented as an interactive book as opposed to a complete etool. The path of an interactive book was chosen as it was a closer fit to the idea of a guide and also reduced the security implications of deploying an etool to the DRN.

4.2.1 Preliminary design and development of the Beta version

The idea of an interactive book meant that the content could be scalable and yet accessible to the users (one of the key problems with a standard document). This was implemented by having multiple levels of detail accessible from every page. For example, if a user only needed broad, high level information they could progress through the SNAG-T and only view this level of content. However, if they required more detail on some of the steps they could click a button and access the detailed information. Finally, if they required very detailed information, background information, or access to the references this could be accessed through the use of expandable text and pop-up boxes. This method of implementation allows the information required by users with different levels simulation and training expertise to be readily accessed.

Generally the development of the SNAG-T was very smooth; however a few minor issues occurred. The largest of these was a reasonably rigid implementation of the interface. This was overcome by modifying some of the code generated by the application to allow a more flexible interface which met the design decisions.

4.2.2 Beta testing of the SNAG-T and production of the final version

Having taken delivery of the Beta version an internal stakeholder group was engaged to test both the process and the interactive tool. Generally the beta testing feedback was positive and only minor changes where required in the final phase. This allowed for the final version to be produced quickly and the remaining time was allocated to ensuring multi browser compatibility.

4.3 Deployment on the Defence Restricted Network

The final version of the SNAG-T is essentially a very large number of interconnected web pages all accessed through an html start page. The key to deploying to the DRN was finding somewhere to host these pages; this proved difficult at first. However as with most tricky problems, once the answer is found the solution appears to be obvious. Our simple solution was to host the SNAG-T on a MS Share Point page. As Share Point is part of the Standard Operating Environment it made implementation easy once the correct permissions were established. Additionally, it meant that the SNAG-T could be updated and re-hosted very quickly without the requirement to engage other groups.

The final part of deployment on the DRN was linking the files hosted on Share Point to the ADSO ComWeb intranet pages. This was simply a matter of building a specific SNAG-T intranet page and providing links to the SNAG-T and the analysis templates. Two screen shots of the SNAG-T are shown in figures 3 and 4. Fig 3 shows the SNAG-T start page while fig 4 shows one of the pages within the process.

![Figure 3: SNAG-T start page](image1)

![Figure 4: SNAG-T Key Outputs page](image2)

5. APPLICATION AND USE OF THE SNAG-T

Having discussed the development and implementation of the SNAG-T as an interactive tool this section will provide and understanding of its possible application. It will discuss how the SNAG-T can be used to support the development of acquisition documents and its possible use during acquisition.

5.1 How the SNAG-T can be applied

The following examples describe how the SNAG-T might be used for development of various business documents which require different levels of detail. As each service and group has different names for different documents within the CSLC the examples are based on generic document types that may be required when acquiring simulation. The first part of the example describes the characteristics of the business document
and the second part describes the possible use of the SNAG-T.

5.1 Feasibility Report/Options Analysis/Initial Business Case/Capability Submission

Business documents such as Feasibility Reports, Options Analysis, Initial Business Cases, and Capability Submissions exist early in the CSLC. They are required to identify the feasibility of a number of training options, of which simulation may be one. The cost estimates associated with these documents are likely to be very broad and may inform later budgetary guidance for this project. The detail required for these documents may be high-level and broad in nature. These documents are likely to be linked closely to an initial analysis of the training need.

When using the SNAG-T for this type of document the level of analysis will reflect the detail required of the CSLC phase. The effort expended on the SNAG-T should focus primarily on Context Analysis and Identify Options. Identify Options will assist in defining the minimum training requirements which are needed to assess the feasibility of any simulation option. A market research study or industry study will be conducted as part of Identify Options. The main steps of the SNAG-T Kernel should be used as a check list when considering each option. By using the SNAG-T Kernel as a check list, simulation specific topics such as fidelity, data, system performance, personnel, facilities, verification, validation, and interoperability are less likely to be missed during the market research phase. Finally, the VFM Assessment should be considered to determine how the simulation options compare to the non-simulation options for meeting the workplace need.

5.1.2 Business Case for a specific simulation option

Business case documents usually exist to obtain or progress approval and funding for a specific simulation option. They are likely to be identifying the benefits of a particular option and may be contrasted against another option. The cost estimates associated with these documents often require near tender quality cost data and need to fit within certain budgetary guidance for the project. The detail required of these documents is likely to be specific to the option but may still be quite broad; however, depending on the approver, certain parts may need to be quite detailed. These documents are likely to be linked to preceding business documents and decisions to progress this simulation option.

When using the SNAG-T for this type of document the level of analysis will reflect the contents required of the document. If this is the first time the SNAG-T is being used for this simulation option then Context Analysis should be completed. The majority of the effort should be expended equally between Identify Options and the SNAG-T Kernel. The level of detail required of the analysis within the SNAG-T Kernel is likely to be quite general. The key outcome is to identify possible simulation specific costs and reduce project risks by early identification of simulation specific characteristics. Finally, the VFM Assessment should be completed against a non-simulation option; doing this will provide more weight to the business case.

If this is a subsequent iteration of the SNAG-T process for the simulation option then the majority of effort should be focused on the SNAG-T Kernel; and previous analysis from the Identify Options phase will be reused. Again, Context Analysis and VFM Assessment should be completed. The advice regarding detail for the SNAG-T Kernel remains the same.

5.1.3 Project/Contract documents such as a Function Performance Specification or Statement of Work

Business documents such as Functional Performance Specifications or Statements of Work exist to describe the requirements of a specific simulation option. They are likely to be describing, in quite high detail, the various functions and requirements of the simulation. It is unlikely that the simulation option will be contrasted to any other option. The cost estimates associated with these documents are to be very specific and will need to fit within well established budgetary guidance for this project. These documents will be linked to preceding business documents and decisions to progress or acquire this simulation option.

When using the SNAG-T for this type of document the level of analysis will reflect the contents required of the document. If this is the first time the SNAG-T is being used for this simulation option then Context Analysis should be completed. The majority of the effort should be expended on the SNAG-T Kernel. Effort expended on the SNAG-T Kernel for this type of document will not be wasted and analysis responses should be described in a similar lexicon to that required of the business document. If creating this type of business document then the links into the detailed SIMMAN guidance will most likely be required.

Again, if this is a subsequent iteration of the SNAG-T the Context Analysis should be completed to focus the work of this iteration, and then the majority of effort should be focused on the SNAG-T Kernel.

5.2 Use of SNAG-T during acquisition

The previous section described how the SNAG-T could be used to support various simulation acquisition business documents; however another possible use of the SNAG-T is during the tendering process. While the SNAG-T is yet to be used for tending, it is envisaged that it could be used in tender development and evaluation.

Given the SNAG-T is an enterprise approved method for analysing simulation needs and requirements the use of SNAG-T could be directed by the Commonwealth in tendering documentation. This would ensure that a consistent analysis method had been used for generating the solutions received in the tender responses.

Further the SNAG-T could be used during tender evaluation as a standardised checklist. This would give
the tender evaluation team an approved method for assessing the solutions within the tender responses. ADSO believe it would be possible to use the SNAG-T in tender evaluation regardless of whether it was used to develop the tender response.

6. FUTURE DEVELOPMENTS
The future development of the SNAG-T could progress on a number of paths. Depending on the uptake and feedback of the SNAG-T the actual process of Simulation Needs Analysis (SNA) will be refined as it is used across multiple projects. The SNAG-T computer-based tool could also be enhanced to increase the level of automation and integration with other business systems. Additionally, the SNA process could be further developed to meet the specific needs of other simulation application areas. A likely candidate would be the area of Simulation Based Acquisition.

7. CONCLUSION
The SNAG-T represents the establishment of a structured and repeatable process for defining simulation needs and requirements in Defence. While it is yet to be used heavily it is a step in the right direction for the use of simulation in training. A well defined and easy to use process should lead to more robust simulation acquisition decisions into the future.