



IMPACT Configuration Management

A Call-up under the IMPACT Standing Offer

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Contract Scientific Authority: N. Collison 902-426-3100 ext 394

Defence R&D Canada – Atlantic

Contract Report
DRDC Atlantic CR 2006-091
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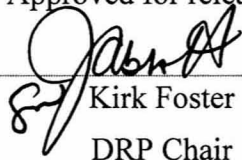
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Kirk Foster
DRP Chair

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Abstract

This report documents the work done to establish configuration management and issue tracking procedures for the IMPACT standing offer and post trial analysis effort. The IMPACT system will be used to support both the Multistatic project and the Networked Underwater Warfare (NUW) Technology Demonstration Project (TDP). The work described within details the creation of processes, installation of tools and migration of the IMPACT code base from RAZOR to Subversion to support concurrent development on the IMPACT code base between these projects. In addition, scripts and results from post trial analysis effort have been placed under configuration management.

Résumé

Ce rapport documente le travail effectué pour établir des procédures de gestion de la configuration et de suivi des problèmes pour l'offre à commandes d'IMPACT et les travaux d'analyse après essai. Le système IMPACT servira à appuyer le projet multistatique et le projet de démonstration de technologies (PDT) de la guerre sous-marine en réseau (NUW). La description du travail dans ce document comprend des détails sur la création des processus, l'installation d'outils et la migration de la base de codes d'IMPACT, de RAZOR à Subversion, pour favoriser le développement simultané dans la base de codes d'IMPACT entre ces projets. De plus, les scripts et les résultats des travaux d'analyse après essai ont été confiés à la gestion de la configuration.

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Executive summary

Background

The Integrated Multistatic Passive Active Concept Testbed (IMPACT) airborne processor will be used to support both the Multistatic project (11cs) and the Networked Underwater Warfare (NUW) Technology Demonstration Project (TDP) in FY06/07. IMPACT has been an excellent example of DRDC Atlantic research providing technology insertion into a military system, as IMPACT was the precursor to the new airborne system, the Modular VME Acoustic Signal Processor (MVASP). During the development of MVASP, IMPACT has been used in many multistatic field trials, allowing for Canadian participation in international collaborations. As a research testbed, IMPACT is continually changed to meet various requirements, so that effective configuration management is essential.

Results

This report documents the work done to establish configuration management and issue tracking procedures for the IMPACT standing offer and post trial analysis effort. The work details the creation of processes, installation of tools and migration of the IMPACT code base from the old repository (RAZOR) to a newer, more developer-friendly repository (Subversion) to support concurrent development on the IMPACT code base between 11cs and NUW. In addition, scripts and results from unclassified post trial analysis effort have been placed under configuration management.

Future Plans

It is planned that the set up of a SVN repository for classified post trial analysis will be completed on the computer VADER. In addition, just having the repositories will not ensure total configuration management of IMPACT. It is suggested that a Change Control Board should be designated to mitigate issues that could arise from parallel development on the same system.

Glessing, B., Carroll, T., and Wamboldt, H. 2006. IMPACT Configuration Management. DRDC Atlantic CR 2006-091. DRDC Atlantic.

Sommaire

Contexte

Le processeur aéroporté du banc d'essai multistatique intégré actif/passif (IMPACT) sera utilisé pour le projet multistatique (11cs) et le projet de démonstration de technologies (PDT) de la guerre sous-marine en réseau (NUW) pendant l'EF 2006-2007. IMPACT constitue un excellent exemple d'intégration de la technologie dans un système militaire par suite de la recherche menée par la RDDC Atlantique, car IMPACT est le précurseur du nouveau système aéroporté de processeur de signaux acoustiques VME modulaire (MVASP). Pendant le développement du MVASP, IMPACT a été utilisé dans de nombreux essais multistatiques sur le terrain, ce qui a permis au Canada de participer à des travaux de collaboration internationale. À titre de banc d'essai de recherche, le système IMPACT est modifié constamment pour qu'il respecte diverses exigences. Par conséquent, la gestion de la configuration est essentielle.

Résultats

Ce rapport documente le travail effectué pour établir des procédures de gestion de la configuration et de suivi des problèmes pour l'offre à commandes d'IMPACT et les travaux d'analyse après essai. Le travail fournit des détails sur la création des processus, l'installation d'outils et la migration de la base de codes d'IMPACT de l'ancien référentiel (RAZOR) à un nouveau référentiel plus convivial (Subversion) pour favoriser, entre le 11cs et la NUW, le développement simultané dans la base de codes d'IMPACT. De plus, les scripts et les résultats des travaux d'analyse après essai ont été confiés à la gestion de la configuration.

Travaux à venir

On prévoit installer un référentiel SVN sur l'ordinateur VADER pour les analyses après essai classifiées. De plus, à eux seuls, les référentiels ne suffiront pas pour assurer la gestion complète de la configuration d'IMPACT. Il est proposé qu'un comité de contrôle des changements soit désigné pour réduire au minimum les problèmes qui pourraient être occasionnés par le développement en parallèle du système.

Glessing, B., Carroll, T., et Wamboldt, H. 2006. IMPACT Configuration Management. RDDC Atlantique CR 2006-091. RDDC Atlantique.

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1 Introduction

This final report outlines the work done under IMPACT Regional Individual Standing Offer (RISO) No. W7707-031973/001/HAL, Call-up Requisition No. W7707-05-3284. This work was performed for Defence R&D Canada (DRDC) – Atlantic under the direction of the Scientific Authority (SA), Nicole Collison, from February 2006 to March 2006.

DRDC Atlantic required CM support for the IMPACT software and related systems. The IMPACT system will be used to support both the Multistatic project and the Networked Underwater Warfare (NUW) Technology Demonstration Project (TDP). A clearly defined process and tools are required to ensure that both projects are well supported and to mitigate the risk of work in one project adversely affecting the other.

The objective of this call-up was to provide both the process and tools necessary to effectively manage the IMPACT system and related resources.

These objectives will be met by:

- Installing a CM tool for IMPACT software
- Checking-in all available IMPACT versions to build a software history
- Branching the software for NUW and delivering an exported version of the software
- Developing a draft software CM process, issue management process and system CM process
- Installing an Issue Tracking and Management Tool for IMPACT
- Generating a CM repository for trial data analysis scripts and results on the DRDC unclassified network and on the classified network inside the shield
- Generating an inventory of computing resources inside the IMPACT lab and documenting the users and root passwords for each resource

This report is broken into two main sections and three annexes. Section 2 provides an overview of the call-up requirements and work performed to meet those requirements. Section 3 documents ideas for future work that were generated during the call-up. Annex A describes the configuration management process, which includes configuration management through Subversion, the role of the Change Control Board (CCB) and the elements of the software design that can be modified. Annex B describes the IMPACT issue tracking system, which includes issue writing guidelines and the issue resolution process. Annex C describes the common administrative tasks related to the IMPACT system and Subversion administration.

2 Work Overview

This section presents an overview of the tasked work and how that work was completed. The tasks for this call-up are listed in Table 1.

As this contract was restricted by a limitation of expenditure and the contract objectives were ambitious, not all requirements were completely implemented, though substantial progress was made. MDA worked with the SA to ensure that the call-up deliverables were satisfactory allowing trade-offs to be made, as required.

The following requirements were not completed:

- The post trial analysis repository requirement, listed in Task 2, was partially completed. The VADER repository has to be configured with the post trial analysis layout, and the trial data needs to be checked-in to the repository.
- The issue management requirement, listed in Task 5, was partially completed. Currently the MySQL (database) backups are not running for the Bugzilla installation on the computer SPRAY.

Table 1. Tasks

TASK	DESCRIPTION
Task 1: Requirements Analysis and Design	The contractor shall meet with the SA to determine the detailed requirements and expectations for this call-up.
Task 2: SVN Repository	<p>The contractor shall work with the SA to select an appropriate computer to host a software configuration management repository based on the Subversion (SVN) management tool. This repository shall be accessible to both the IMPACT developers and the various computers used for multistatic data analysis on the unclassified DRDC network. The contractor shall install and configure the SVN repository for web-based access including an initial list of users provided by the SA.</p> <p>The contractor shall spend no more than two days attempting to migrate the IMPACT software development history from RAZOR (a previously used configuration management tool) repository to the head of the a new SVN repository. If this migration is not possible, the contractor shall check-in the head of the RAZOR repository to the head of the SVN repository.</p> <p>The contractor shall check in each IMPACT baseline starting with the oldest and progressing to the newest. The software shall be tagged after each baseline is committed.</p> <p>The contractor shall add a repository for trial data analysis scripts and results to the same SVN installation. The contractor shall also install another copy of SVN in the DRDC shield where it can be accessed from Vader and Whale. This installation will also be used for trial data analysis scripts and results. Users' access must be configured according to the list specified by the SA.</p>

TASK	DESCRIPTION
Task 3: IMPACT Software for NUW	<p>The contractor shall branch the IMPACT software at a baseline specified by the SA. This branch shall be called IMPACT_NUW. The contractor shall export the IMPACT software from the head of this branch and provide it to the NUW project.</p>
Task 4: Process Development	<p>The contractor shall work with the SA to develop documents for CM, Issue Management and System CM. These documents shall be provided as Annexes in the Final Report.</p> <p>The CM process shall include (at a minimum):</p> <ul style="list-style-type: none"> • The development allowed on each branch (NUW Release and IMPACT Development). This includes elements of the software design that may or may not be changed. • How the software will be reintroduced to the CM tool from the NUW TDP. • How changes on the IMPACT_NUW branch will be migrated back to the IMPACT development branch. • How design changes will be reviewed and approved. <p>The issue management process shall include (at a minimum):</p> <ul style="list-style-type: none"> • How users and developers will enter issues into the database. • How issues will be prioritized and managed including DRDC and contractor responsibilities. <p>The system configuration management process shall include (at a minimum):</p> <ul style="list-style-type: none"> • How IMPACT related hardware is inventoried and controlled. • How system access is controlled and tracked. • How the network and network security is configured. • How root passwords are changed and tracked.
Task 5: Issue Tracking Tool	<p>The contractor shall install the Bugzilla issue tracking tool on the DRDC unclassified network where all local users and developers can access the database via a web based interface. The contractor shall configure the initial components and release numbers in the database and transfer and document issues into the database including enhancement ideas.</p>
Task 6: System Configuration Management	<p>The contractor shall use the system CM process documentation to compile the required scripts and results, providing an initial baseline of systems, users, passwords, etc.</p>

Task 7: Generate Documentation	<p>The following details shall be documented in the contractor report:</p> <ul style="list-style-type: none"> • A description of the work performed, any issues encountered and how they were addressed and suggestions for further work. • A copy of all process documents.
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2.1 SVN Repository

This section provides an overview of the setup of the Subversion repositories as described in Task 2.

2.1.1 SVN server selection

SPRAY.drdc-rddc.gc.ca was chosen to host the SVN repositories outside of the shield. This computer is accessible on the unclassified DRDC network to the IMPACT developers and other computers used for multistatic data analysis. VADER.drdc-rddc.gc.ca was chosen to host the SVN repositories inside of the shield. The repository on VADER is accessible both locally and from the computer WHALE.

2.1.2 Install of Subversion on SPRAY

At the time of install, the computer SPRAY was using Fedora Core 3 for its operating system. The first step in the install was to upgrade Subversion from 1.1 to revision 1.2.1. This was the latest revision of SVN available for Fedora Core 3, and includes bug fixes and features that 1.1 does not. The folder “/opt/svnroot/” was chosen for the main repository location. All repositories will be created under this folder. Apache was configured to allow web-based access to the Subversion repositories.

2.1.3 Setup of the IMPACT repository on SPRAY

The IMPACT repository was created under the folder “/opt/svnroot/” as “impact”. The initial repository layout was set up using the “Repository layout Template” described in Annex C, which defined top-level folders of “branches”, “tags” and “trunk”. Web-based access to the repository was configured, including an initial set of permissions based on a list of users provided by the SA. See Section C.2 for detailed information on how permissions are set up for this installation of Subversion.

2.1.4 Migration of the RAZOR repository

After an initial investigation at MDA, it was confirmed that RAZOR could be ported to Subversion within the specified timeframe. The actual conversion process was cumbersome and time consuming, but the history from the RAZOR repository was maintained through the conversion to SVN. Following the layout template (see Section C.3 in Annex C), the RAZOR code base was initially placed in the trunk folder of the IMPACT repository. Once tested, this was tagged under the development tag as “end_of_razor”.

http://SPRAY.drdc-rddc.gc.ca/svn/impact/tags/development/end_of_razor.

2.1.5 IMPACT baseline check in

The IMPACT baseline tar-balls were sequentially added to the repository on SPRAY. There were many layout changes between the last committed revision in Razor and the first baseline tar-ball. As a result of these changes, lining up the previous revisions with the tar-ball base lines was challenging. However, most of the RAZOR code was linked with its base-line counterpart. The IMPACT software development history was successfully migrated for the major development lines of the IMPACT project.

For each tar-ball, the repository trunk was first modified to match the tar-ball's layout. This involved moving several folders and occasionally deleting folders that were not included in the tar-ball release. Once the repository trunk and tar release layouts matched, the tar-ball files were copied over the repository files. Using "svn status" we were able to determine which files needed to be added, removed or updated. Once the repository was consistent with the tar-ball, a build test was performed on the repository head. A copy of the repository head was then copied under tags/releases with a name to indicate the baseline release represented. The baselines that were added to the repository are listed under tags/releases as impact8.x.x. See Figure 1 for a detailed view of the IMPACT repository layout.

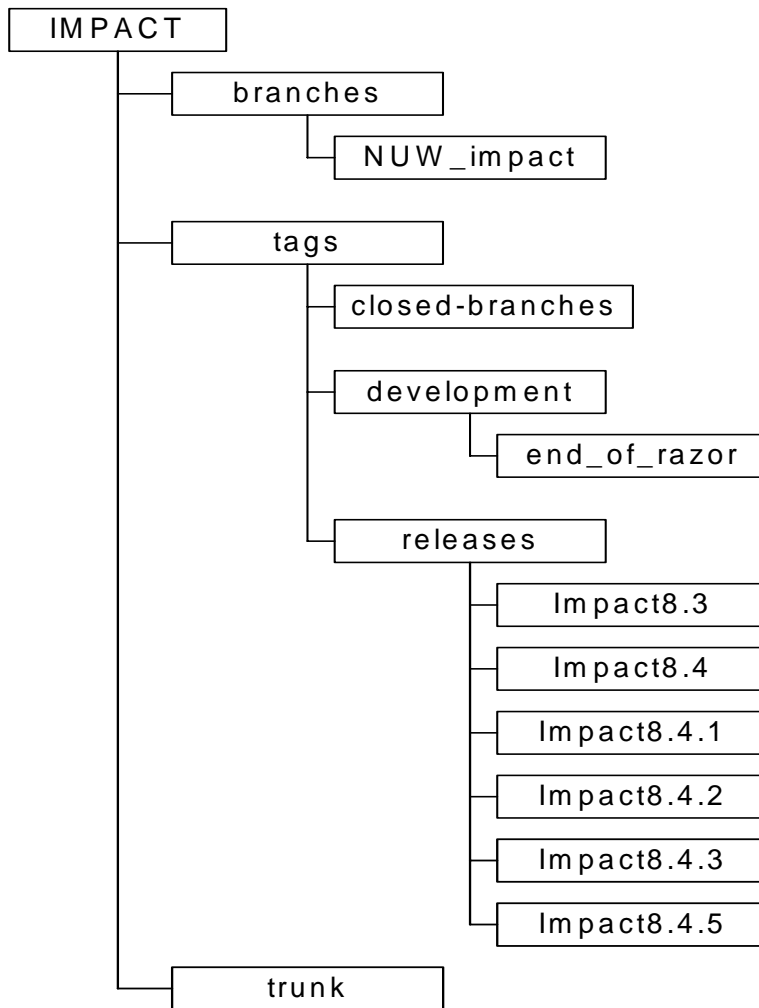


Figure 1. Detailed view of IMPACT repository

2.1.6 Install of Trial data repository on SPRAY

A second repository was added to SPRAY to provide version control for the trials located on “bigdisk” and “bigdisk2”. This repository was named “trials” and was stored under /opt/svnroot. The trials were logically grouped to ease administration and use. Due to size constraints, data directories such as “processed” and “raw_data” were not placed under version control. The folder hierarchy was not changed on the actual disks; the groupings only exist in the repository itself (see Section C.3.1 for a description of the layout template used for the trial data and Figure 7 in Annex C for a detailed view of the Trial repository layout).

2.1.7 Install of SVN on VADER

The computer VADER located in the shield was configured with the 64-bit version of RedHat ES 4 as the Operating System (OS) at the time of install. The 64-bit versions of the SVN packages were placed on a CD and installed on VADER. The following packages were installed:

- mod_dav_svn-1.2.1-0.1.2.el4.rf.x86_64.rpm
- subversion-1.2.1-0.1.2.el4.rf.x86_64.rpm
- subversion-devel-1.2.1-0.1.2.el4.rf.x86_64.rpm
- subversion-perl-1.2.1-0.1.2.el4.rf.x86_64.rpm

Following the defined install layout used on SPRAY, the folder /opt/svnroot/ was created on VADER as the primary repository location. Apache was configured to allow web-based access to the SVN repositories on the shield LAN.

2.1.8 Installation of SVN clients

In order for remote systems to properly interface with the SVN repositories, the SVN client must be installed. SVN clients were successfully installed on the systems PUFFIN, GANNET, and CABOT.

2.2 IMPACT Software for NUW

Using the “svn copy” command, a copy of the latest IMPACT build 8.4.5 was placed under “branches” as “NUW_impact”.

http://spray.drdc.rddc.gc.ca/svn/impact/branches/NUW_impact

General Dynamics Canada (GDC) was provided with a Tar file of the current DP version. Tar files were made of the current ADI, DM and SP code to capture the current (HEAD) version of those components as well. Duplicate hard disk drives (HDD) for PUFFIN and the VME chassis were made for NUW development.

2.3 Process Development

This section describes the work done to address the process development requirements of the call-up. This included consultation with the SA and subject matter experts.

2.3.1 Software Configuration Management Process

The IMPACT configuration management process was based on the process employed on the Noise Monitoring Software (NMS) SOA. This process is based on industry standard configuration management practices and has been continuously refined over the course of the SOA. The objective of the CM process is to identify and control changes in the software configuration items (SCI). By following the CM process, the developers are able to work concurrently, coordinate their work effectively and reliably reproduce software configuration items (i.e. releases). For more detail, see Annex C.

2.3.2 Issue Management Process

The IMPACT issue management process was also based on the process from the NMS SOA. The purpose of the issue management process is to provide a procedure for organizing, maintaining, and tracking issues. The approach consists of an issue control tool (i.e., Bugzilla) and procedures that enable end users and developers to document, prioritize, and resolve issues. For more detail see Annex B.

2.3.3 System Configuration Management Process

All IMPACT related hardware is inventoried and tracked using the standard DRDC inventory tracking procedure. System access for IMPACT is controlled and tracked by the System Administrator for the Cooperative ASW Group. This includes changing and tracking the root passwords for all IMPACT systems. The IMPACT systems are set up behind a firewall separating them from the rest of the internal DRDC network. The rules allow all outgoing traffic and block all incoming traffic, other than traffic from the secure shell (SSH).

2.4 Issue Tracking Tool

This section describes the work completed to address the issue tracking tool requirements of the call-up. This included installation of the tool Bugzilla. Upon investigation, it was determined that there were no issues in Razor.

2.4.1 Installation

The Bugzilla bug tracking system (Version 2.20) was installed on the machine SPRAY to support issue tracking. Bugzilla requires an underlying database to hold its data. MySQL (Version 11.18) was installed and configured on SPRAY to support Bugzilla.

2.4.2 Administration

Routine administration of Bugzilla is done through the web interface (add users, create products, components, versions, etc. and modify access permissions and operating configuration) as are all normal user operations (enter and edit bug reports, change bug status, set up email notifications/whining, etc).

2.4.3 Configuration

Backup of the Bugzilla database is done by backing up the MySQL database (database: bugs) and are dumped in /opt/backups. Apache has been configured to “all access” for Bugzilla through the URL:

<http://spray.drdc-rddc.gc.ca/bugzilla/>

Most of the Bugzilla parameters were left at their default values. As users gain experience with the Bugzilla tracking tool, desired configuration changes will most likely become apparent.

2.4.4 Notes

References: Bugzilla in the subversion repository: <<http://spray/svn/bugzilla>>

Main Bugzilla Website: <<http://www.bugzilla.org>>

Bugzilla Documentation: (on the website and accessible to the Bugzilla repository users on Spray at: <<http://spray/svn/bugzilla/trunk/bugzilla-2.20/docs/>>

Bugzilla FAQ: <<http://wiki.mozilla.org/Bugzilla:FAQ>>

Note: the following packages were installed on SPRAY to satisfy various dependencies.

- Mar 29 10:40:22 Installed: perl-GD.i386 2.30-2.1.fc3.rf
- Mar 29 10:42:15 Installed: perl-Chart.noarch 2.3-1.1.fc3.rf
- Mar 29 10:43:44 Installed: perl-Heap.i386 0.71-1.1.fc3.rf
- Mar 29 10:43:45 Installed: perl-Graph.noarch 0.20105-1.1.fc3.rf
- Mar 29 10:45:59 Installed: perl-PatchReader.noarch 0.9.5-2.1.fc3.rf
- Mar 29 10:47:06 Installed: perl-AppConfig.noarch 1.56-2.1.fc3.rf
- Mar 29 11:09:58 Installed: perl-MailTools.noarch 1.67-2.1.fc3.rf
- Mar 29 11:15:03 Installed: perl-GD-Text-Util.i386 0.86-0.1.fc3.rf
- Mar 29 11:15:03 Installed: perl-GD-Graph.i386 1.43-0.1.fc3.rf
- Mar 29 11:15:03 Installed: perl-GD-Graph3d.noarch 0.63-2.1.fc3.rf
- Mar 29 11:15:03 Installed: perl-XML-RSS.noarch 1.05-1.1.fc3.rf
- Mar 29 11:15:04 Installed: perl-Text-Reform.noarch 1.11-1.1.fc3.rf
- Mar 29 11:15:04 Installed: perl-Text-Autoformat.noarch 1.13-1.1.fc3.rf
- Mar 29 11:15:04 Installed: perl-XML-Simple.noarch 2.14-2.1.fc3.rf
- Mar 29 11:15:04 Installed: perl-Pod-POM.noarch 0.17-1.1.fc3.rf
- Mar 29 11:15:13 Installed: perl-Template-Toolkit.i386 2.14-1.1.fc3.rf
- Mar 29 11:15:13 Installed: perl-XML-XPath.noarch 1.13-2.1.fc3.rf

2.5 System Configuration Management

After consulting with the SA, it was determined that the initial baseline of users and passwords is under the control of System Administrator for the Cooperative ASW Group. The working components are kept assembled in the lab rack, or in the flying racks, and the spares are kept in the spares box. The assembly information is in a wiring diagram and in the operations manual.

Here is a list of systems and a short description of their purpose:

- CABOT: VxWorks development machine, (old Razor repository) (Solaris 8)
- PUFFIN: IMPACT DP and development machine (Sun Forte 6U2) (Solaris 8)
- GANNET: Spare IMPACT DP and development machine (Sun Forte 6U2) (Solaris 8)
- LIEF: Firewall machine (RedHat 9)
- CURTIS: Development PC, runs various simulators, (Visual Studio) (Windows XP)
- SPRAY: IMPACT Subversion repository and Bugzilla interface and database (Fedora Core 3)

3 Recommendations

The following section provides contractor input for future work and recommendations.

3.1 Configuration Management

A dedicated configuration manager should be selected to maintain the repository. This will provide a single point of contact for all CM work on IMPACT.

It is important that both IMPACT and NUW coordinate any modifications to the IMPACT code base. If extensive changes are made to either branch, it may become too costly or impossible to synchronize the branches. It is recommended that a Change Control Board be established immediately to reduce this risk.

Recently, an IMPACT Engineering Study was conducted to propose options for IMPACT's direction. It is recommended that the findings from this call-up and NUW IMPACT objectives be reviewed to determine if the two projects can coordinate any future work and to mitigate costly conflicts from merges.

The Shield SVN installation is partially completed. It is recommended that the setup, configuration and import of IMPACT trials be completed to make certain that a record of changes is kept for all analysis related tasks. This will ensure that the results from any particular analysis effort can be reproduced.

3.2 Issue Management

It is strongly recommended that any issues related to IMPACT be recorded in the IMPACT issue tracking system. If issue management is not centralized it will become difficult to maintain awareness and prioritize issues between IMPACT and NUW.

3.3 Refinement

Although the processes presented in this document are based on procedures that are well established, it will be necessary to fine-tune them for IMPACT. It is recommended that the procedures included in this document be continuously reviewed and revised.

4 References

1. Ben Collins-Sussman, Brian W. Fitzpatrick, C. Michael Pilato, (2002, 2003, 2004, 2005, 2006) Version Control with Subversion For Subversion 1.2, Creative Commons.
2. The Bugzilla Team, (2006), The Bugzilla Guide 2.20.1, <http://www.bugzilla.org>.
3. IMPACT Engineering Study, DRDC CR 2006-094.

List of symbols/ abbreviations/ acronyms/ initialisms

ADI	Acoustic Data Interface
CCB	Change Control Board
CM	Configuration Management
DM	Data Manager
DRDC	Defence R&D Canada
GDC	General Dynamics Canada
HDD	Hard Disk Drive
IMPACT	Integrated Multistatic Passive Active Concept Testbed
NUW	Networked Underwater Warfare
RISO	Regional Individual Standing Offer
SA	Scientific Authority
SCI	Software Configuration Item
SOA	Standing Offer Agreement
SP	Signal Processor
SVN	Subversion
TDP	Technology Demonstration Project

Annex A - Configuration Management Process

Annex A describes the configuration management process, which includes configuration management through Subversion (SVN), the role of the Change Control Board (CCB) and the elements of the software design that can be modified.

A.1 Configuration Management Process

This section describes the process for configuration management and the SVN commands used. Figure 2 presents the process for configuration management. For a more detailed understanding of SVN, see “Version Control with Subversion” (<http://svnbook.red-bean.com>).

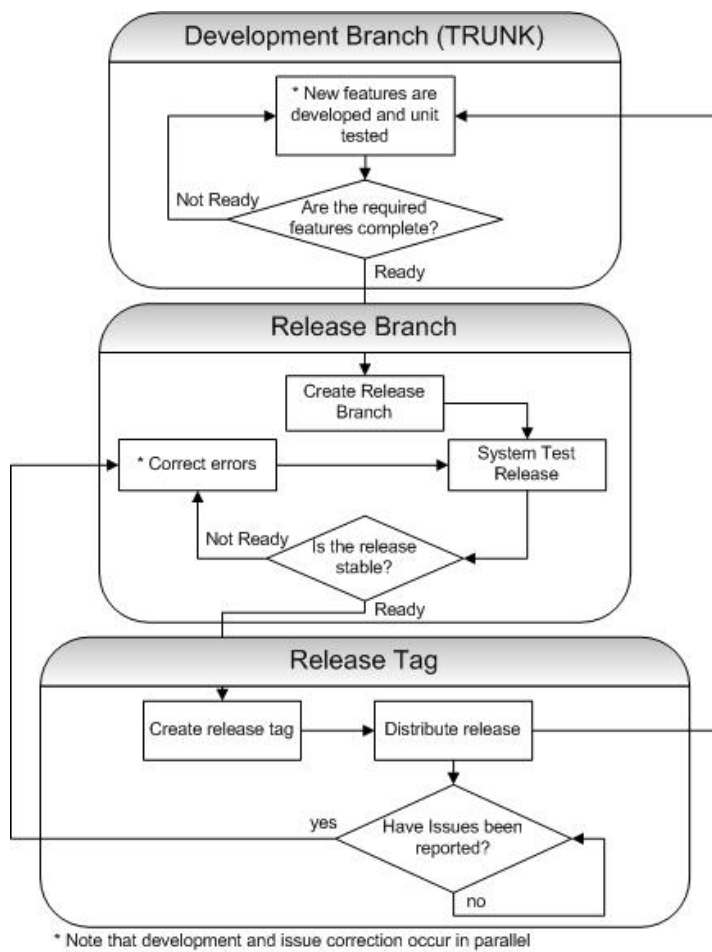


Figure 2. Configuration Management Process

A.1.1 Development

The TRUNK is used for development. By nature the code on this branch is unstable and should not be relied on for demos, releases, etc. If a number of projects are developing software towards a release and you want to shield your work from changes, branch from the TRUNK while developing:

```
$ svn copy -m "release x" http://spray.drdc-rddc.gc.ca/svn/impact/TRUNK  
http://spray.drdc-rddc.gc.ca/svn/impact/branches/TRUNK\_project\_xyz
```

Plan to merge your changes back to the TRUNK in the near future. This will allow others to benefit from the modifications made:

```
$ svn merge -r n:m http://spray.drdc-rddc.gc.ca/svn/impact/branches/TRUNK\_project\_xyz  
http://spray.drdc-rddc.gc.ca/svn/impact/TRUNK
```

A.1.2 Branching for Releases

After the required features have been committed back to the TRUNK and a reasonable amount of unit testing has been conducted, the TRUNK should be branched to create a release branch:

```
$ svn copy -m "release x" http://spray.drdc-rddc.gc.ca/svn/impact/TRUNK  
http://spray.drdc-rddc.gc.ca/svn/impact/tags/releases/impact\_release\_1\_0\_x
```

The release number should take the following form:

```
major.minor[.revision[.build]]
```

The level at which the release number is incremented depends on the number of changes and their importance. The major number is increased when there are significant jumps in functionality. The minor number is incremented when only minor features or significant fixes have been added. The revision number is incremented when minor bugs are fixed. Note that once a release branch is created, no new features should be added. Any new development should be conducted on the TRUNK.

A.1.3 Release Tags

After a reasonable amount of system testing has been conducted a release tag should be created:

```
$ svn tag http://spray.drdc-rddc.gc.ca/svn/impact/branches/impact\_release\_X  
http://spray.drdc-rddc.gc.ca/svn/impact/tags/releases/impact\_release\_1\_0\_0
```

No changes can be made to a tag. Any subsequent fixes will be made on the release branch and incorporated into the next release.

A.1.4 Syncing the Release and TRUNK

Periodically, the release branch should be merged back to the TRUNK to allow fixes to be included in development work:

1. Checkout a copy of the TRUNK
\$ svn co <http://spray.drdc-rddc.gc.ca/svn/impact/TRUNK>
2. Merge the changes from the IMPACT_NUW branch to the local copy of the TRUNK.
\$ svn merge -r n:m http://spray.drdc-rddc.gc.ca/svn/impact/tags/releases/impact_release_X.

A.2 Change Control Board (CCB)

This section describes the CCB. It is important that modifications to code base are managed properly to ensure that the NUW and IMPACT branches can share functionality and fixes.

The CCB would be responsible for reviewing and approving changes between NUW and IMPACT. The CCB should include, at a minimum, the scientific authority and at least one engineering representative from NUW and IMPACT. Figure 3 provides a flowchart for the CCB process.

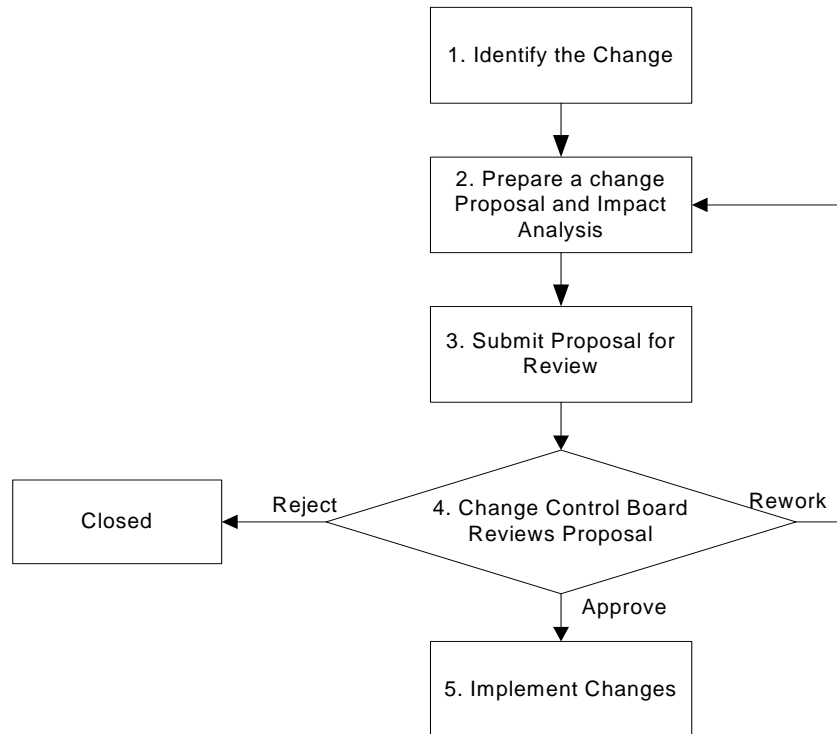


Figure 3. Change Control Process

The CCB should implement the following steps:

1. The NUW or IMPACT project identifies a problem or requests a change.
2. A change proposal is prepared and an impact analysis is conducted.
3. The proposal and impact analysis is submitted to the change control board.
4. The change control board reviews the proposal and impact analysis:
 - i. If the proposal is approved proceed to step 5.
 - ii. If clarifications or further impact analysis is required return to step 2.
5. If the proposal is rejected a reason is recorded and the change proposal is closed.
6. Change is implemented.

A.3 Allowable Changes to IMPACT Design

This section specifies the elements of the IMPACT design that may be modified. These elements of the software design should not be changed:

- Prodat interface,
- DREA.DAT file format,
- Directory structure (that would affect merging the NUW version of impact from bitkeeper with the main trunk), and
- Fundamental design that would make it difficult to merge changes.

A.4 Changes Made to NUW Branch

This section describes how the export from the NUW branch will be reintroduced to SVN, and how those changes will be migrated back to the TRUNK.

A.4.1 Reintroducing the IMPACT_NUW Export

The steps outlined below describe the procedure that will be used to reintroduce changes made on NUW baseline back to the IMPACT repository.

1. Obtain an export from the NUW repository (Consult with NUW project).
2. Check out a copy of the IMPACT_NUW branch.
\$ svn co http://spray.drdc-rddc.gc.ca/svn/impact/branches/IMPACT_NUW
3. Copy the NUW export over the checkout from step 2.
\$ cp -R path_to_NUW_export IMPACT_NUW
4. Change to IMPACT_NUW checkout.
\$ cd IMPACT_NUW
5. Check in all changes.
\$ svn ci -m "sync with NUW"

A.4.2 Merging IMPACT_NUW Branch With the TRUNK

The procedures in Section A.1.4 describe how to merge changes made on the IMPACT_NUW branch back to the TRUNK.

A.5 Trial Repositories

This section describes the structure of the trials repository and its usage.

A.5.1 Structure

The trials are logically grouped based on area of study (i.e. TIAPS, Auralization, etc). Each area of study contains branches, tags and trunk folders. See Figure 6 in Section C.4 for a detailed view of the repository structure. The tags folder contains closed-branches, development and release sub-folders (as shown in Figure 4 in Section C.3.1).

A.5.2 Usage

This section describes the SVN commands used with the trials repository. For a more detailed understanding of SVN see “Version Control with Subversion” (<http://svnbook.red-bean.com>).

A.5.2.1 Creating a Trial Repository

A trial should be checked into the appropriate area of study. If the area of study does not exist then one should be created using the template provide at /etc/svn/layout_template on the computer SPRAY. See Annex C, Section C.3.1 for a description of the layout template.

```
svn copy -m “insert message here” http://spray.drdc-rddc.gc.ca/svn/etc/svn/layout\_template and http://spray.drdc-rddc.gc.ca/svn/trials/area\_of\_study
```

A.5.2.2 Importing a Trial

After an empty trial folder has been created, the trial shell scripts, IDL scripts, and log files should be imported into the folder. Run the following command at the root of the directory you wish to import:

```
svn import -m “insert message here” http://spray.drdc-rddc.gc.ca/svn/trials/area\_of\_study/trial\_name
```

Note: only scripts, notes, logs, screenshots, etc. should be imported.

A.5.2.3 Checkout a Working Copy

After the trial has been imported into the repository you should checkout a working copy. `svn co http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/TRUNK`

A.5.2.4 Analysis

Any modifications to the scripts, notes, logs, etc should be checked in. This will ensure that a record is kept of all work that was done and that the analysis results can be reconstructed in the future.

```
svn ci -m “insert message here” file
```

A.5.2.5 Tagging

The trial should be tagged whenever a milestone is met and/or the analysis effort is concluded. This will provide reference points for critical stages of the analysis work. Critical milestones should be tagged in the development folder and any delivered analysis results should be tagged in releases.

Use the following command to tag a critical milestone:

```
svn copy -m "creating a milestone" http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/TRUNK/study1 http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/tags/development/study1_milestone1
```

Use the following command to tag a release (i.e. results that may support a final report):

```
svn copy -m "creating a release" http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/TRUNK/study1 http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/tags/releases/study1_release1
```

A.5.2.6 Branching

This section describes how and when to branch. If the work to be done is a continuation of previous analysis work, or you wish to protect work in the TRUNK from changes, then it should be branched.

Use the following command to continue analysis work from a previous one:

```
svn copy -m "continuing with previous work" http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/tags/releases/study1_release1 http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/tags/TRUNK/study2
```

Use the following command to create a branch to protect the TRUNK:

```
svn copy -m "continuing with previous work" http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/TRUNK/study1 http://spray.drdc-rddc.gc.ca/svn/trials/area_of_study/trial_name/branches/study_an_investigation
```

Annex B - Issue Management

The following annex describes how to access the IMPACT issue tracking system, how to compose an effective issue report and the procedure that will be followed to resolve the issue.

B.1 Accessing the Issue Tracking System

Follow the steps outlined below to access and create an account in Bugzilla.

1. Open <http://spray.drdc-rddc.gc.ca/bugzilla/> in a web browser
2. If you do not have an account, create one:
 - i. Click on the Open a new Bugzilla account link.
 - ii. Enter your email address in the account field.
 - iii. Click on the Create Account link.
 - iv. Bugzilla will now email you a password.
3. Click on the “Log In” link at the bottom of the main Bugzilla page.
4. Enter your email address and the password emailed to you in step 3.

B.2 Composing an Effective Issue Report

This section provides a summary of the Bug Writing Guidelines page that can be accessed from the “Enter a new bug” report link in Bugzilla.

A useful issue report is normally reproducible and specific. The steps to reproduce the issue should be as detailed as possible. If an engineer can duplicate the problem it will be easier for him/her to isolate and correct the problem effectively and in a timely manner.

The following steps should be used to enter an issue in Bugzilla:

1. Conduct a search to find out if it is a known issue. If you have any additional information that will help the engineer resolve the problem quicker, document it with the issue.
2. If it is a new issue, choose "Enter a new bug" from your Bugzilla main page.
3. Select the product that you've found the issue in.

4. Enter your e-mail address, password, and press the "Login" button. (If you don't yet have a password, leave the password field empty, and press the "E-mail me a password" button instead. You'll quickly receive an e-mail message with your password.)
5. Enter the product, version, component and OS.
6. Enter the severity. The default is normal.
7. Assign an engineer to the issue. If this field is left blank the issue will be assigned to the default engineer.
8. Enter additional email addresses for anyone else that should receive updates when the issue is modified
9. Enter a summary for the issue.
10. Enter a description for the issue. This field should include an overview, the steps to reproduce, actual results and expected results. The overview should provide a more detailed description of the summary. The steps to reproduce the issue should be detailed but straightforward. The actual results should include the observed. The expected results should describe what you are expecting to see.
11. Enter any other additional information that will assist the engineer.

B.3 Issue Resolution Approach

This section describes the process the engineer will follow to resolve issues and is based on Bugzilla's issue resolution process.

B.3.1 Issue Management/Responsibilities

This section describes how the issues will be prioritized and managed including DRDC and contractor responsibilities. In Bugzilla, an issue can have a priority and severity. There are five levels of priority (P1-P5, where P1 is the highest) to indicate the importance of the issue. It should be the responsibility of the CCB to determine the priority of the issues. The severity describes the impact the issue is having on the users and/or developers.

The following severity settings are available:

- **Blocker:** The issue is preventing users from working or stalling development and there is no work-around.
- **Critical:** The issue is causing severe problems for users/developers but they can still continue working.
- **Major:** The issue is causing major problems.

- Normal: This is the default severity for the issue.
- Minor: The issue is causing minor problems or there is an easy workaround.
- Trivial: The issue is an extremely minor superficial issue.
- Enhancement: The issue is an enhancement.

B.3.2 Issue Workflow

An issue will go through a series of states as it is investigated, confirmed and resolved. An issue is set to “New” or “Unconfirmed” when it is reported. It can be set to “New” when it is confirmed, the reporter is permitted to confirm it, or the issuer receives enough votes (has been observed by several users).

- Unconfirmed: The issue has recently been added to the system and has not been confirmed yet.
- New: The issue has been confirmed but is not being investigated by a developer yet.
- Assigned: A developer is investigating the issue and generating a solution. The issue may be reassigned to another developer and transition back to the New state.
- Resolved: The issue has been resolved and will be marked as:
 - Fixed: The issue has been fixed, tested and checked into the repository.
 - Duplicate: The issue is a duplicate.
 - Wont fix: The issue will never be resolved.
 - Works for me: The developer could not confirm the issue.
 - Invalid: The observed behaviour is not an issue.
 - Remind: The issue will probably be resolved in the next release.
 - Later: The issue will be resolved in a later release.
- Reopened: The issue has not been corrected or the correction is not acceptable.
- Verified: The correction has been accepted.
- Closed: The issue has been closed.

Annex C - System Configuration Management

The following annex describes how to perform common tasks related to the repository and the repository layout.

C.1 Common repository tasks

This section will describe in detail how to perform common repository tasks.

C.1.1 Creating a new repository

All SVN repositories must be created under `/opt/svnroot/` to be accessible by Apache. The Apache user must be set to own the entire repository with permissions of 750.

```
> svnadmin create /opt/svnroot/repositoryname  
> chown -R apache /opt/svnroot/repositoryname  
> chmod -R 750 /opt/svnroot/repositoryname
```

The `svnaccess.conf` file must be modified, as described in Section C.1.3, in order to access the repository. Once created, all repositories should be configured using one of the Templates described in Section C.2. This will ensure a common layout between repositories.

C.1.2 Adding a user and changing passwords

To add a user, issue the following command:

```
> htpasswd -m /etc/svn/svnpasswd username
```

You will be prompted to enter a password for the user. This is the same process used to change a user's password. If the user already exists, this command simply updates the password field.

C.1.3 Changing repository permissions

There are two files that determine permissions on the repositories. They are:
`/etc/svn/svnaccess.conf`
`/etc/svn/svnperms.conf`

On SPRAY, the `/etc/svn` directory is under version control. After editing any files in `/etc/svn`, the user should use "svn commit" to update the repository.

By default, no access is permitted to a repository; you must modify the `svnaccess.conf` file to allow access to your repository. As both files contain repository specific groups, it is important to manually keep these groups in synch to ease administration.

C.2 Repository security

All of the repositories are configured to use a central set of authentication files located under the directory `"/etc/svn/"`. Access to the Subversion repositories is tightly controlled using three separate types of security.

C.2.1 File level permissions

File level permissions are configured to prevent access to the repository by any means other than Apache. This means clients must use a URL to access the repository. The configuration files located under `"/etc/svn/"` can only be modified by the root user.

C.2.2 Apache level access

The Apache process uses two configuration files for authentication and access permissions. All user accounts and passwords are stored in `"/etc/svn/svnpasswd"`. Apache repository access permissions such as `"read"` and `"write"` are stored in `"/etc/svn/svnaccess.conf"`. Permissions are set per repository and configured using an `"admin"` group and a `"user"` group for each repository. If a user does not have read access to a repository they will not be able to see that it exists.

C.2.3 Repository action level permissions

SVN allows you to define what actions users may perform on certain defined directories. These actions are limited to `"add"`, `"remove"` and `"update"`. These permissions are controlled by the file `"/etc/svn/svnperms.conf"`. Permissions are set per repository and each repository is configured with a `"users"` and an `"admins"` group. For ease of administration, these groups should be kept in synch with the groups for the `"/etc/svn/svnaccess.conf"` file. As an example, these permissions can limit users allowed to create releases, or prevent others from changing tags.

C.3 Repository Layout Template

This section describes the two types of repository layouts that can be implemented. Both templates are virtually identical. The trial template simply adds a layer of trial groups above the main template.

C.3.1 General Repository Template

The General Repository Template is based on recommended practices from the SVN handbook. The purpose of the template is to organize the repository into logical groupings that are easy to manage and secure. There are three main groups to the template, “trunk”, “branches” and “tags”. See Annex A for a detailed description of proper use.

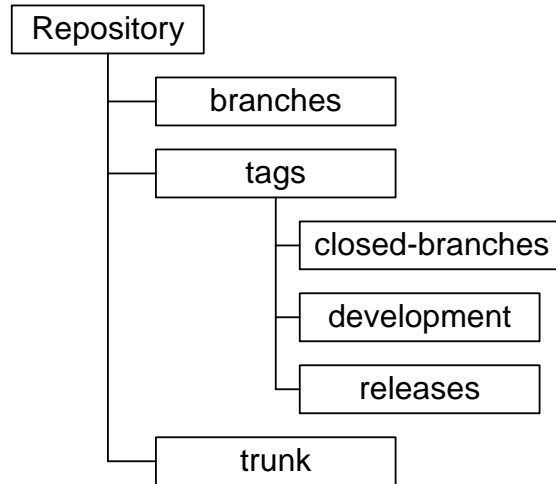


Figure 4. General view of the Layout Template

C.4 Detailed View of Repository Layout

The following are some detailed figures showing how the “trials” and “impact” repositories were structured at the end of the initial import.

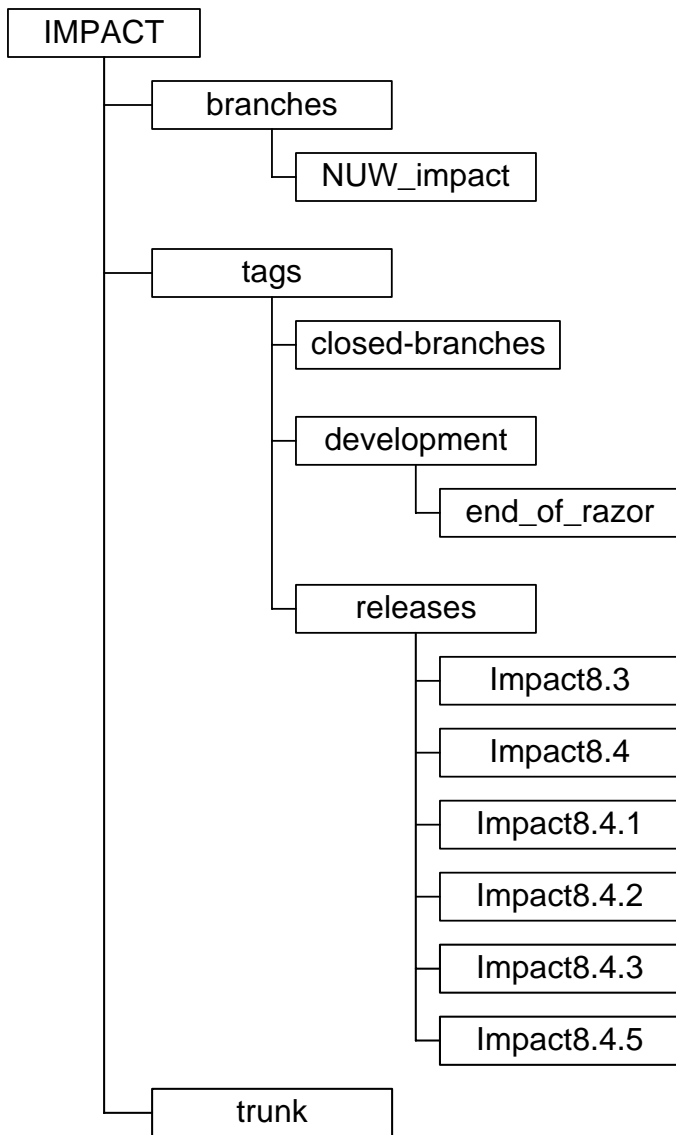


Figure 5. Detailed view of the impact repository

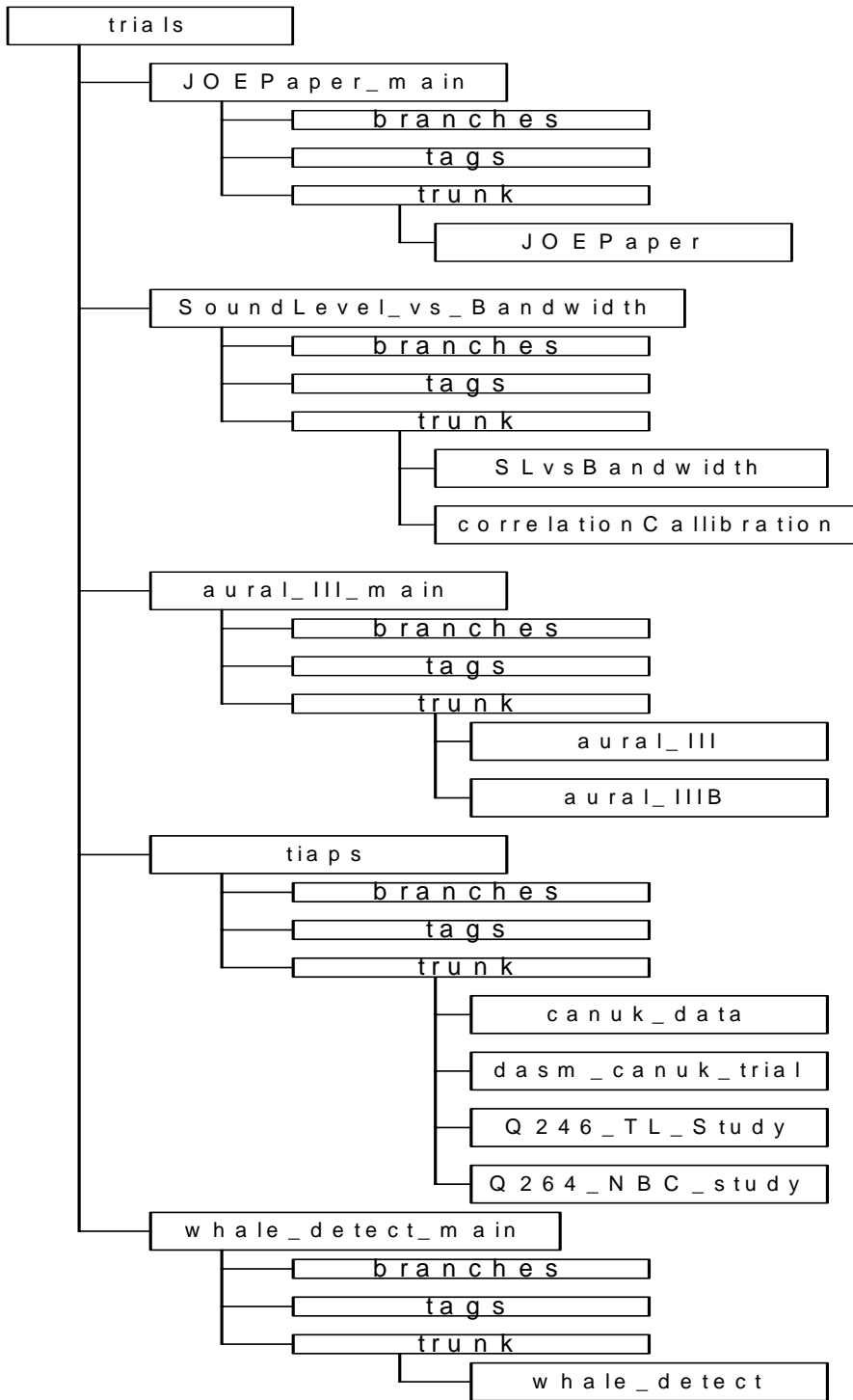


Figure 6. Detailed view of the trials repository

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This report documents the work done to establish configuration management and issue tracking procedures for the IMPACT standing offer and post trial analysis effort. The IMPACT system will be used to support both the Multistatic project and the Networked Underwater Warfare (NUW) Technology Demonstration Project (TDP). The work described within details the creation of processes, installation of tools and migration of the IMPACT code base from RAZOR to Subversion to support concurrent development on the IMPACT code base between these projects. In addition, scripts and results from post trial analysis effort have been placed under configuration management.

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IMPACT, MVASP, configuration management

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