Knowledge Access using CMS Platform: Development of CVRDE Library Portal

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Abstract:
This paper discusses the development of dynamic library website, using Drupal – an open source Content Management System (CMS). A dynamic website offers library an opportunity to connect and interact with its patrons. The main purpose of this paper is to showcase steps involved in the development of Knowledge Resource Centre (KRC) Portal and to increase awareness among library professionals about the open source CMS and its benefits. It explains our experience of working with Drupal to enable other library professionals to evaluate its suitability to their environment. This paper will describe in brief the free and open source CMS – Drupal, characteristics, features, requirements, installation steps, and how it can be used for developing attractive and dynamic websites.

Keywords: Content Management System (CMS), Drupal, Library Portal, Library Website, Website Design

1. Introduction

Combat Vehicles Research & Development Establishment (CVRDE) is one of the premier research establishments of the Defence Research & Development Organization (DRDO) under Ministry of Defence.

CVRDE functions with the mission to design develop and lead to production of tracked armoured vehicles and specialist vehicles to meet the needs of the services. The main areas of activity of CVRDE are to design, develop, manufacture prototypes and performance evaluation and transfer of technologies of tracked combat vehicles, specialist tracked vehicles, unmanned ground vehicles and related sub-systems for Armoured Fighting Vehicles (AFVs) like diesel engines, automatic transmission systems, suspension systems, weapon control systems, automotive electrical and electronics systems, etc. and also products for aerospace secondary power drive applications. [3]

Technical Information Centre (TIC) was formed with the establishment of CVRDE in 1969, for providing AFV related information support to CVRDE project activities. Later Reprography Centre and Photography Section were merged and renamed as Technical Information & Reprography Centre (TIRC) and was functioning with the conventional library functions till Feb 2010.

In March 2010 the library was shifted to the new separate two-storey building named as ‘Knowledge Resource Centre (KRC)’. The KRC has been planned with a view to offer more user centric services by offering modern facilities and providing pertinent information services within minimum possible time.

In KRC, the data centre, e-resources access facility and stack-cum-reading halls are centrally air-conditioned with adequate lighting facilities. The environment at the KRC provides an ambient atmosphere for the library users for quiet reading with appropriate stacking facility for the existing stock (40000 Nos.) as well for future expansion (100000 Nos.). Users are provided with ergonomically designed library furniture for comfortable reading. New library technologies like RFID based circulation system; touch screen OPAC facility, e-journals access facility and digital library have been successfully devised and implemented. Now, KRC is an ISO 9001:2008 Certified Library. [2]

In tune with the modern infrastructure and facilities, KRC has planned to provide web-based access facility to all its online resources and digital contents at users desktop for which KRC wanted to have a new portal using a Web Content Management System (CMS). As the existing portal was a static one and was unable to keep pace with the user's requirement, KRC wanted to migrate from the static site to dynamic site.

KRC required a solution that would prove to be fast, have an extremely easy-to-use interface, scale to thousands of services and offer the flexibility to grow and change quickly to keep pace with the user's requirement. KRC turned to OSS CMS to leverage its vast array of features that allow library professionals to easily and quickly spread library service updates.

After a careful analysis of leading open source content management systems like Drupal, Joomla, Wordpress etc. KRC selected Drupal.

2. Why Drupal was chosen?

KRC wanted to migrate KRC Portal from a vendor dependant static site to an open-source, scalable, extendable, robust and dynamic CMS that would meet KRC web needs presently and in the future. The Drupal CMS was selected for the following reasons:

1. Drupal has a lot of out-of-the box content management functionalities that fulfill most of our requirements. The Drupal node concept has been a good fit for KRC article alert content types (research, news, education, and comment), as have the easier multi-user admin tools for content creation, editing and maintenance, path module for renaming URLs, and RSS feed generation and taxonomy module for the specialties pages like thesaurus, sitemap etc.. There are pages aimed at scientific and technical professionals, and pull in content from across KRC subscribed resources.
2. Drupal has thousands of contributed modules. CCK, Views, and Panels 3 were useful for building KRC Portal key pages such as the E-Resources subscribed, Home, KRC Facilities and Services, and KRC Collection.
3. Drupal core is modular. It has flexible and very well documented hooks Application Programming Interface (API). This makes it easy to extend it with new modules, and to integrate it with other services.
4. Drupal has one of the biggest, most vibrant, and responsive open source communities with knowledge database to mine and learn from.
5. Drupal is a scalable and extendable CMS with wide variety of modules that enable a developer to build a system that can meet current site requirements and easily add new functionality in the future.
6. Advanced system of Roles and Permissions makes Drupal a perfect platform to securely distribute content management to select users.

7. The security feature of Drupal is best among all CMS available today. Drupal has a very good track record in terms of security, and has an organized process for investigating, verifying, and publishing possible security problems. Drupal's API and default configuration are designed to be secure when used in their default modes. Issues like Injection, Cross Site Scripting, Session Management, Cross Site Request Forgeries, and others all have standard solutions in the Drupal API. [6]

3. Building KRC Portal using Drupal:

3.1 Goals

The primary goal of this project was to migrate KRC website from a proprietary static site to dynamic Drupal site. Migration was comprised of two parts:

- Conversion of a set of complex layouts and proprietary HTML code into a Drupal-based site that uses **PHP - H*ypertext* P*reprocessor***, an open source, server-side, HTML embedded scripting language used to create dynamic Web pages and modules (mostly contributed and custom where needed) and a custom theme. [4]

- The look of the site was to be improved, so few graphical design changes were made.

- The secondary goal was to make improvements wherever possible. The timeline for the project, given the limited resources, was 2 to 3 months. Also, with more than 500 page views and 100 unique visitors per month, KRC wanted to be sure the performance wasn't diminished.

3.2 System Requirements

The primary requirements of the site were as follows:

I. **Hardware:**
Server - A server is a computer/device which manages access to centralized resources or services in a network.
Clients – Desktop computers/Terminals.

II. **Software:**
Operating System Software- The software platform required for stable functioning of the CMS (Content Management Software i.e. Drupal) like UNIX, Linux, and Windows (any one).

Database - A structured collection of records is stored here. Drupal uses a database to store contents for its site- e.g., MySQL.

Web server - The software responsible for serving web page request by the client in a web environment. Examples are Apache and Microsoft IIS.

PHP - The PHP Hypertext Preprocessor is a programming language that allows web developers to create dynamic content that interacts with databases.

Drupal - An open-source platform and content management system (CMS) for building dynamic web pages offering a various range of features and services including user administration, publishing workflow, discussion capabilities, news aggregation, RSS feed, Feedback and commenting functionalities and XML publishing for content sharing purposes.

III. Recommendations by Drupal community

Drupal will work on Apache 1.3 or Apache 2.x hosted on UNIX or LINUX. Majority of Drupal based CMS are developed using Apache as there is more community experience available and testing performed on these versions.

For database Drupal will however work on MySQL v3.23.17 and 4.0 but it is strongly suggested to use 4.1 or 5.0 and above version of MySQL for compatibility with Drupal 6.

In order to provide an incredibly simple site-editing interface, it was clear from the beginning that the bulk of the work on the front-end would involve using JavaScript to implement the desired user interface. KRC used **jQuery, jQuery UI**, and a series of **jQuery plugins**. [8]

KRC wanted to design a flexible and user-friendly website that would serve as the principal intranet resource for KRC users. The new site meets all its goals; it is elegantly designed, provides more intuitive single window access to contents via strong, organized information architecture integrated with few other server systems, and establishes a new vibrant look and feel across multiple KRC web services. Users can access all KRC resources & services at their desktop through this new KRC portal.

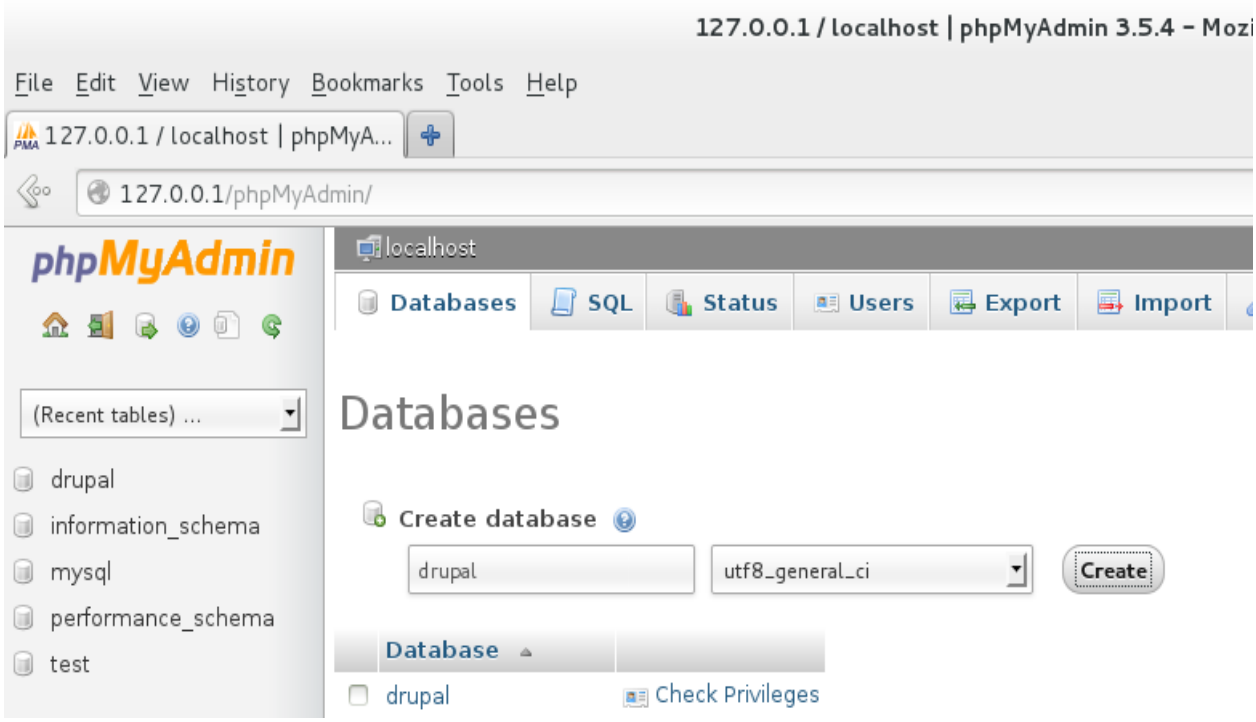
3.3 Drupal Installation

Drupal installation is automatic by running a script which automatically populates database tables and sets the correct settings in **settings.php** file.

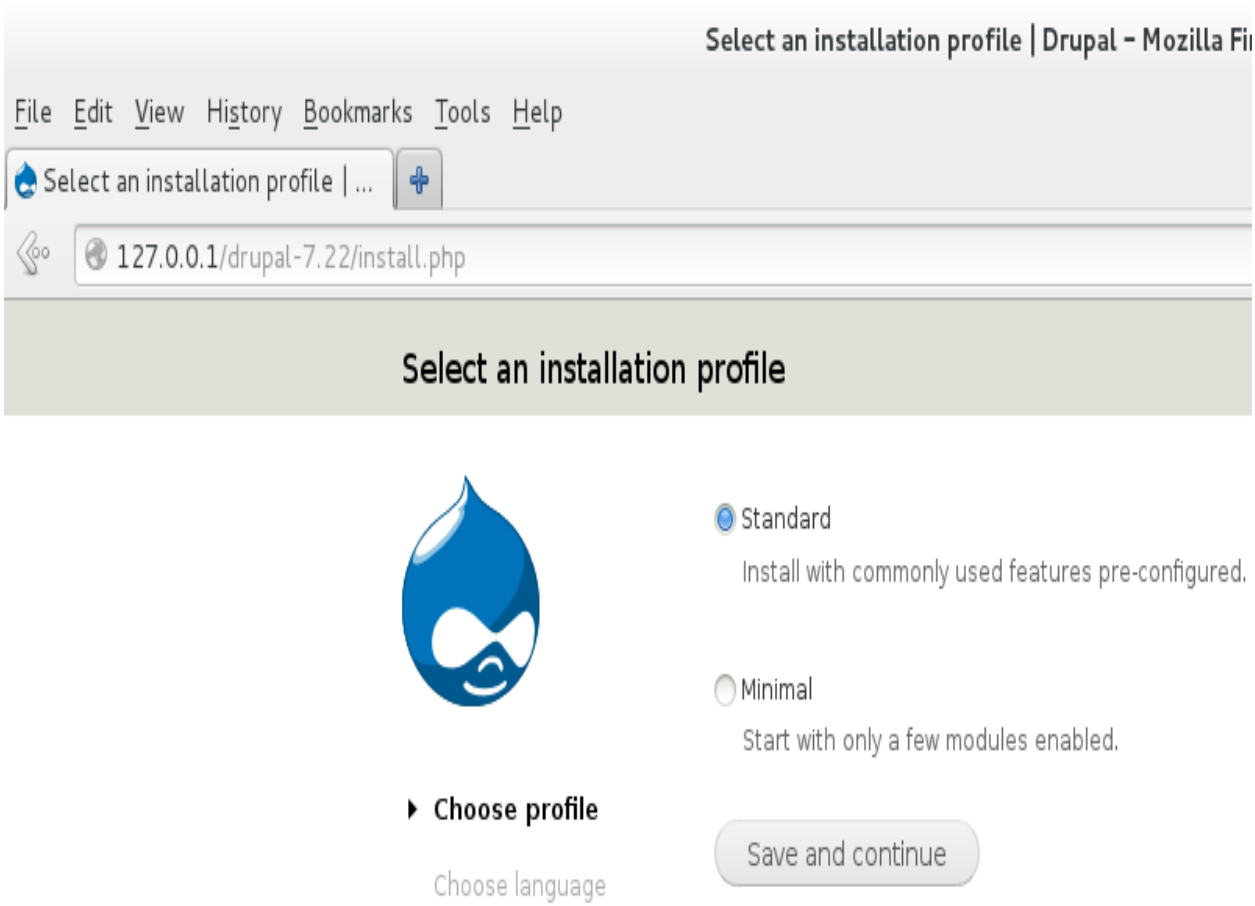
Important steps for installation are:

- Download latest Drupal release from **http://drupal.org/**
- Download latest version of XAMPP and install.
  XAMPP is a cross-platform package consisting of Apache, HTPP Server, MySQL database, PHP interpreter, and PERL interpreter. XAMPP is a reliable and fast way to set up environment for PHP programming. It provides all the components required for developing, running, debugging, and unit testing of PHP applications. XAMPP is a good alternative for installing and configuring a web server, a PHP engine, a database server and a debug engine separately. [9]
- Copy and rename default.settings.php to settings.php. Both the **default.settings.php** and **settings.php** file needs to be copied in ***sites/default directory***
- Create the database: Drupal requires access to a database in order to be installed. First create a new database for your Drupal site.
- Browse the URL in web browser **http://localhost/phpMyAdmin**

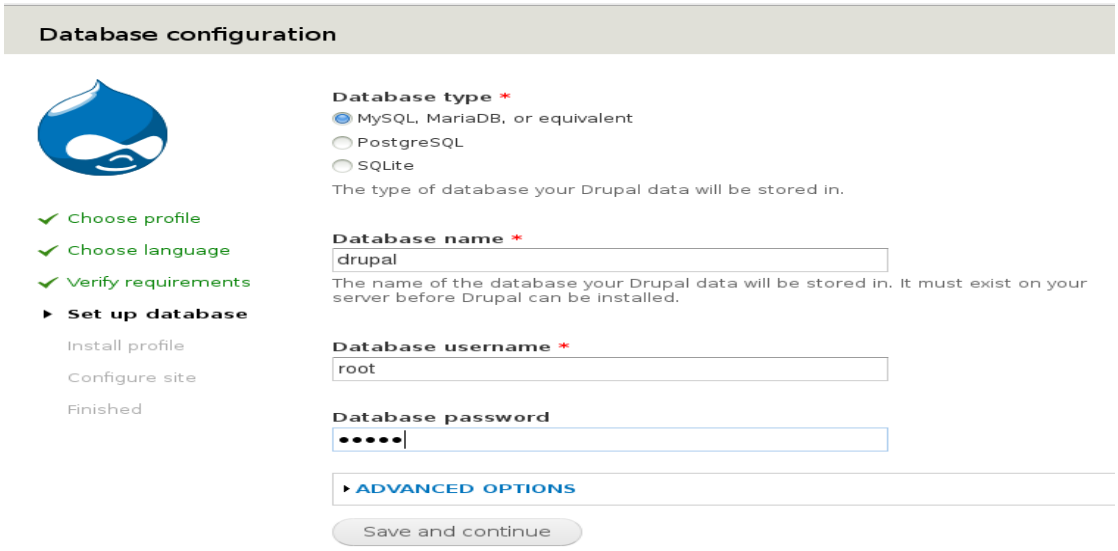
It will ask for user name and password.
Type User name – root / Password – ****** (of our choice)



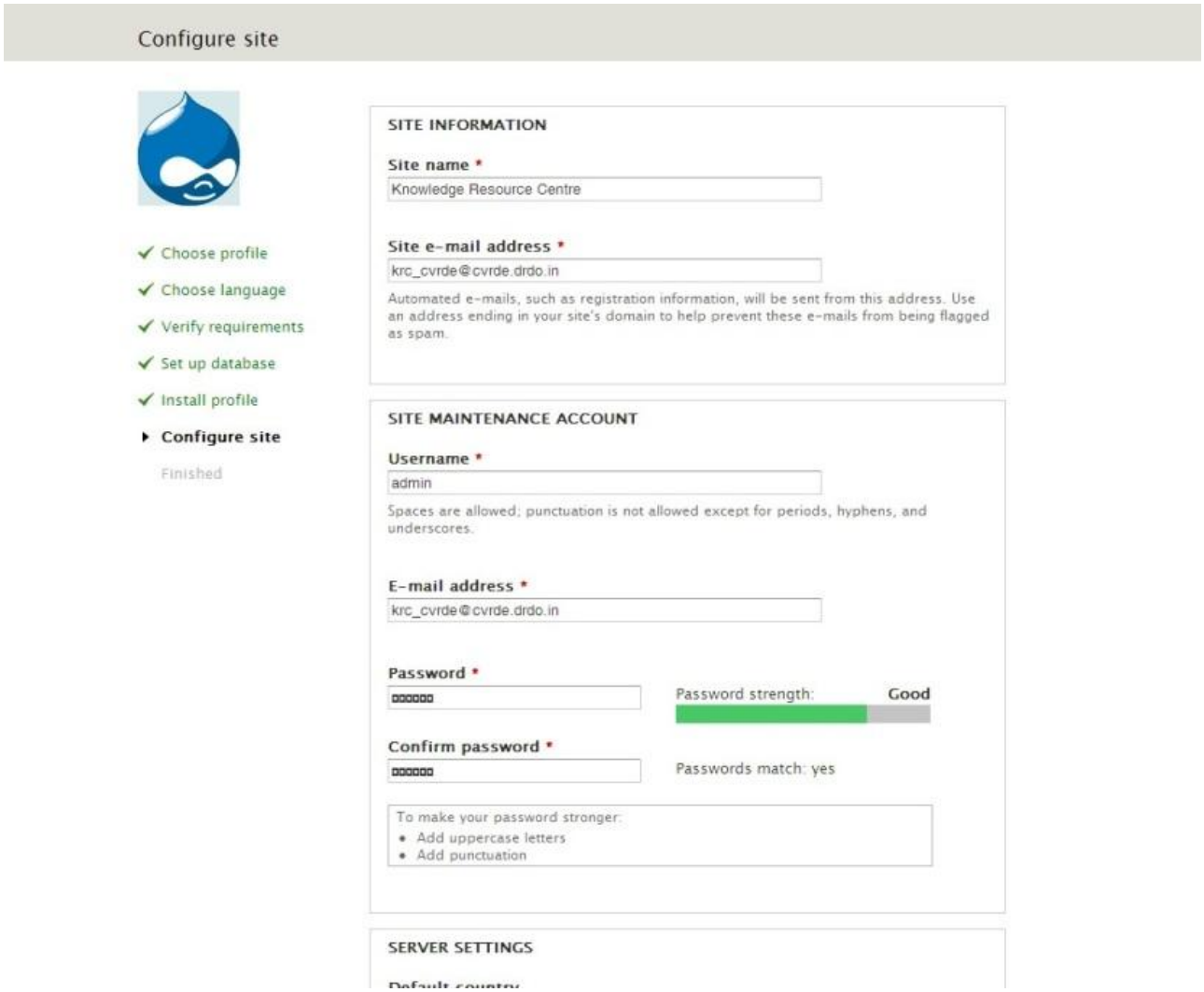
• Run the web installer script
To run installer scripts type the URL of the Drupal on the browser address bar.
The installation URL is: http://127.0.0.1/drupal

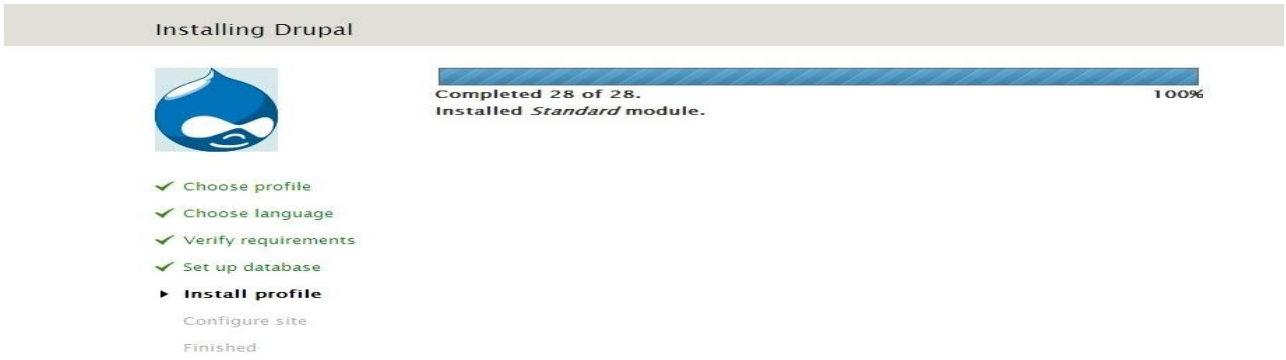


3.3.1 Database configuration



3.3.2 Initial Profile Configuration and Drupal Installation





3.4 Drupal Customization

3.4.1 Front-end Design

Through a series of meetings with KRC Officers & internal staff and checking other institute/organizations library website, KRC reorganized the information architecture to create well-structured navigation making KRC Portal a more intuitive website to use.

After the information architecture was complete, KRC designed website graphics and imagery to be professionally in line with the KRC Portal and the current library requirements. KRC applied the redesigned look and feel to third-party sites like NPTEL video, SAE Papers, Standards and KRC micro-sites such as on KRC Digital Library and KRC Institutional Repository built on GSDL platform. Bringing all KRC websites, micro-sites, and third-party systems in line with the look and feel of the KRC Portal was a key success metric that was achieved.

KRC provided the Portal with a Style Guide and set of standards for writing and design to ensure all future web content aligns with the KRC look and feel. Additional features which were implemented to improve front-end design include a jQuery Superfish module for mega menu functionality, as well as a custom *Article Alert* and *News Flash* built with jQuery and Ajax to highlight KRC updates.

3.4.2 Themes

Drupal community provides a number of free themes for customers to choose from. All KRC Portal themes are **Waffles**. On top of being a great base for its themes, Waffles enabled the JavaScript to work well. [10]

3.4.3 Back-end Development

Whereas KRC Portal's front-end largely consists of JavaScript backed up by Drupal modules and theme, the back-end uses MySQL database and custom Drupal modules with PHP.

KRC developed the Drupal CMS for campus vide access as an intranet site to allow KRC staff to manage the KRC portal, from one easy-to-use, web-based administrative dashboard. KRC created specific content types and a new workflow process based on conversations with internal staff. This process allows the staff to adhere to a review path for web content as it is created, edited, and posted to the site. The custom Drupal install profile on the front-end communicates with the back-end database to set up themes, roles, filters, Pathauto and ImageCache settings, amongst other things.

3.5 Outcome

The project is a major upgrade over the previous portal for both content creators and administrators. This site now provides a path to the future that will scale with KRC needs. KRC Portal homepage and usage are shown in the figures.

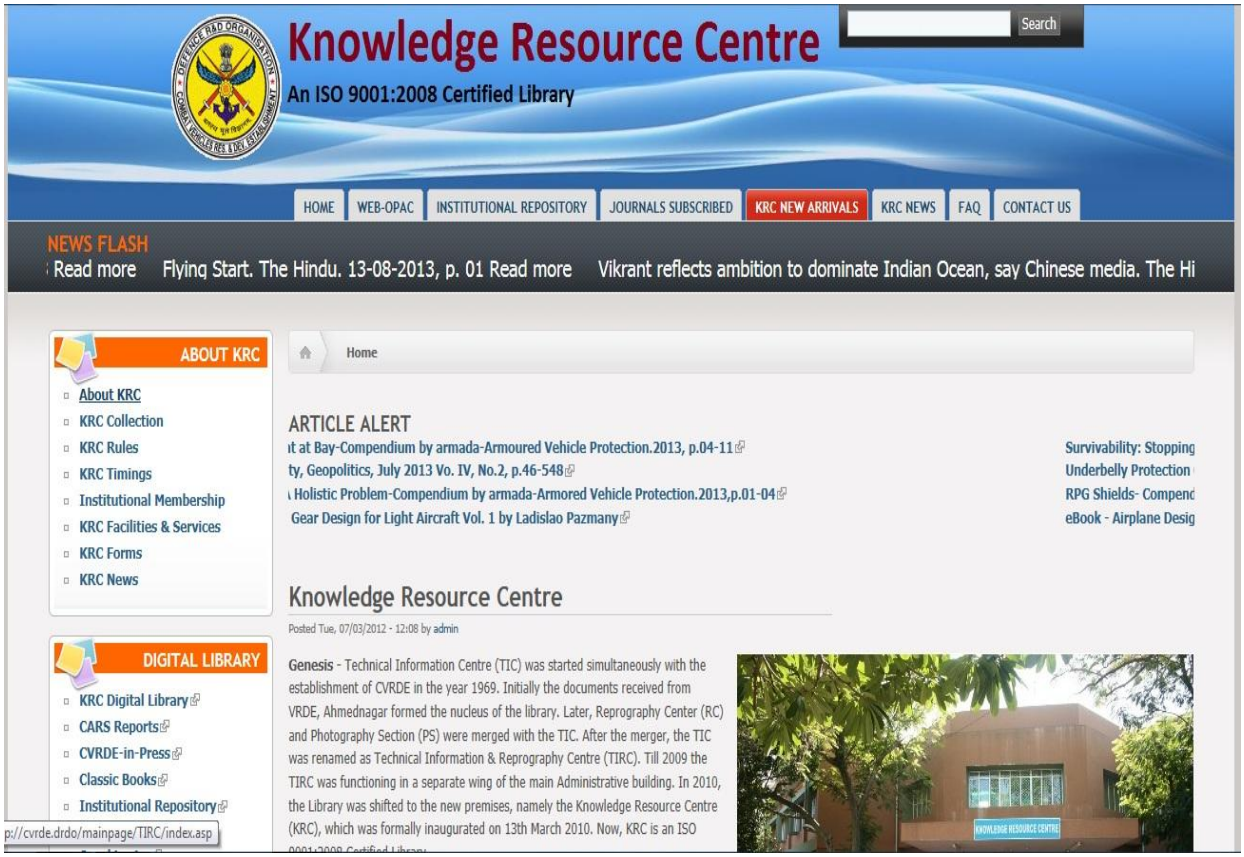


Fig.1

Fig.2

4. Conclusion

The new KRC Portal was launched in May 2013. When the project was first conceived, KRC had five main objectives:

- Provide single window access to all online contents of KRC
- To boost discoverability of new content as it gets updated each day, particularly on the homepage
- Increase user access to KRC resources
- Increase overall traffic
- Promote the six existing and two new content channels (NPTEL videos, SAE Papers, Standards, KRC Digital Library, KRC Institutional Repository, Web OPAC, Article Alert and News Flash)
- Drive referrals to other KRC products and services.

The new-look of KRC Portal with automated content feeds are also proving effective usage and promoting new content. Finally, KRC Portal, appears to be driving more traffic to sister sites. User feedback has been broadly positive. KRC launched with a FAQ, feedback option, and contact information for KRC Portal customer services team. KRC continue to refine the site and have identified few more services to meet the scientist requirements.

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