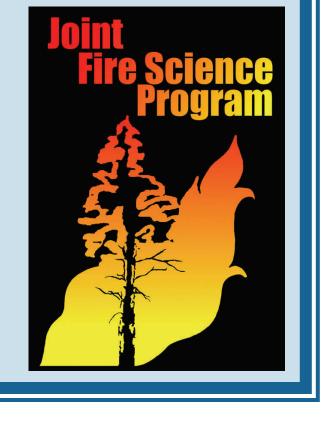


The Interagency Fuels Treatment Decision Support System

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ABSTRACT

The Joint Fire Science Program (JFSP), acting in concert with the Fuels Management Committee (FMC), initiated the Software Tools and Systems (STS) Study in March 2007 to address the proliferation of decentralized software systems in the fuels treatment analysis and planning domain. A strategic assessment completed in March 2008 led to the development of a conceptual design to address the issue. Soon after, a software design for a service-oriented architecture (SOA) framework was developed for field-level fuel treatment planning. Both designs were developed under the guidance of an interagency team of fuel treatment planners and software system developers. The system, provisionally named the Interagency Fuels Treatment Decision Support System (IFT-DSS), will be released as a proof of concept in Spring 2010. The complete, fully functional system is scheduled to be in use by fuels treatment specialists by Spring 2012.

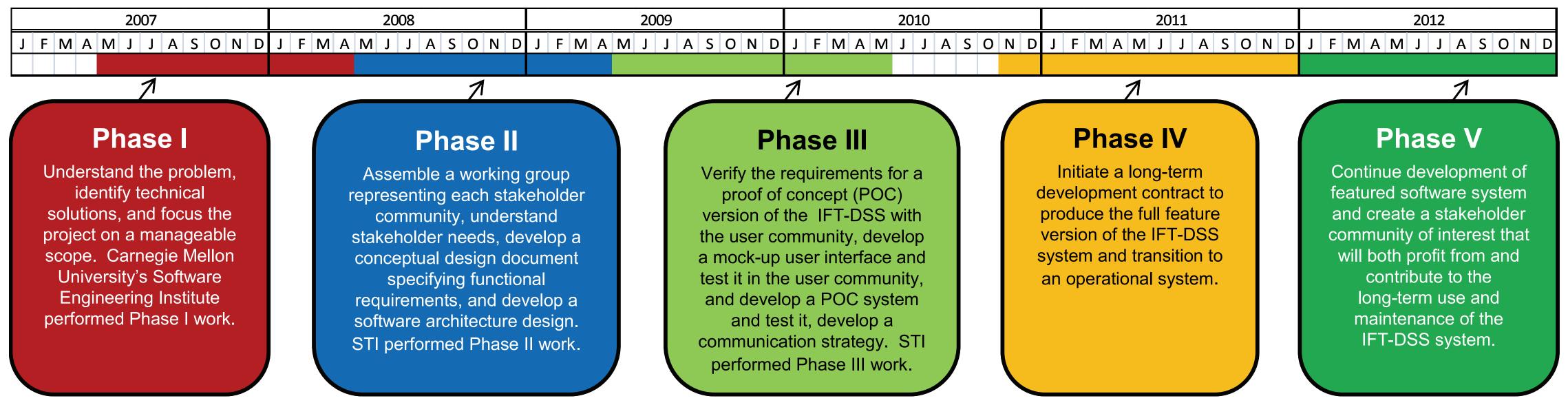
The IFT-DSS will provide one user interface that will enable command and control for preexisting and newly developed software modules and data sets. It will support treatment unit-

scale and landscape-scale analyses, provide data visualization functionality, estimate of fire behavior and first-order fire effects, and support quantitative risk assessments. It will also permit the use and integration of standardized and custom data sets. The IFT-DSS will allow fuels treatment analysts and planners to build custom analysis flow paths and store intermediate and final results for repeated analysis of alternative scenarios. The IFT-DSS is designed as a web-based, collaborative system that will enable scientific model developers to register their models and tools within the system as callable software services and make them available to IFT-DSS users. In the longer term, it is envisioned that the IFT-DSS will be interoperable with a small number of broad-scope collaborative SOA systems such as the Wildland Fire Decision Support System (WFDSS) and the BlueSky Framework. This poster explains the motivation for, functionality of, and vision behind the JFSP IFT-DSS project.



METHODS

Software Tools and Systems Study Timeline



The STS Study will be conducted in phases (described above) and Phase III of the STS Study is currently underway. The overall project objectives are to (1) develop and test a collaborative, SOA framework that can reduce the software chaos in the fire and fuels domain and (2) deploy the SOA framework as a web-based decision support system for the fuels treatment focus area.

RESULTS

Phase I

A study team from Carnegie Mellon University's Software Engineering Institute identified the best solution for addressing the current chaos in fire and fuels treatment software options: a sophisticated, collaborative

In a distributed collaboration environment,
what we want is ...

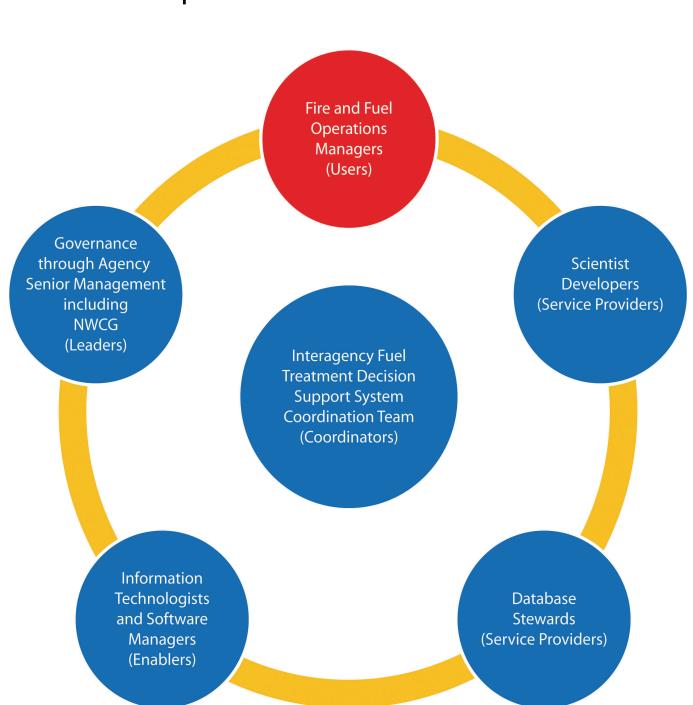
...that can take its place within the context of a mission environment

...that can be configured into the capability required for a given operation...

...conforming to key interface standards...

Modular, reusable elements...

software system that can function as a communications broker for current and future software tools. As an example, the study team pointed to a software system called the BlueSky Framework, a well-received smoke-modeling package developed jointly by the USDA Forest Service AirFire team and Sonoma Technology, Inc. (www.blueskyframework.org). The BlueSky Framework links several independent software models for fuel loading, fire



consumption and emissions, and smoke dispersion and assembles them under a common web-based user interface. Users can select their own analysis pathways by combining data and science models specifically to address the question at

The Software Engineering Institute also recommended the development of a detailed communications plan that carefully defines the project's stakeholder communities and the ways in which community members will interact with the project.

Phase II



Fuels treatment
practitioners and managers
across federal agencies
were asked to identify the
software tools used most
frequently for fuels
treatment planning and
describe how planning is

performed. Results showed that the respondents:

- Use the most simple tools available
- May not know that other tools exist
- Have little guidance on which tools to use
- Spend a lot of time "stringing" tools together for specific purposes
- Spend a lot of time acquiring and preparing data
- Do not widely use the systems that exist for fuels treatment planning

Results from Phase II were used to develop a work flow diagram defining the fuels treatment planning decision support process. The flow diagram served as the basis for the functional specifications of the IFT-DSS software architecture design that was produced as part of

Phase II.

Fuels Treatment Planning Decision Support Process area of interest (AOI) Imputation analysis Updated vegetation data Current year data preparation & quality control View/assess output data Simulate & analyze fire behavior Simulate alternate Analysis complete generate final documentation sociological, ecological Develop composite index of values benefit/loss Identify/prioritize treatment areas FFE-FVS Select treatments to apply Select treatment areas Simulate post-Simulate vegetation = human mediated action

Phase III

A software design specification for the IFT-DSS was developed to provide a scientific modeling framework to house a variety of fire and fuels models, vegetation and geophysical data, and user information and analysis results. The interface will be accessible from any standard

analysis results. The interface will be accessible from any standard computer with Internet access.

Software tools and data will be accessible through one user interface and users will be able to create custom analysis pathways.

A mock-up of the graphical user interface was released to gather early feedback from the user community. The web-based navigation system is functional, but no real data or software tools are connected. For the purpose of the mock-up, a few sample pathways were activated. Version 0.0.1 of the IFT-DSS proof of concept software was released in November 2009.

A communications strategy will be implemented in parallel with the IFT-DSS software development. The purpose is to document the process of developing a network of stakeholders who have responsibilities for and gain valuable services from the IFT-DSS. The communications strategy document:

- Describes stakeholder communities and their characteristics
- Presents a plan for enhancing awareness and use of the software by stakeholder subgroups
- Describes the IFT-DSS
 development team's
 suggested transition of
 the software from the
 originators, JFSP and
 the National Interagency
 Fuels Coordinating
 Group, to the USDA
 Forest Service, the
 Managing Partner for
 the National Wildfire Coordinating Group

Interagency Fuels Treatment Decision Support System Fire Behavior Fire Behavior Results Fire Effects Fire Effects Results Canc Selected Objective Rx Burn Planning Selected Model Pathway FlamMap Consume Results Graph View Table Vie

Decision Support System

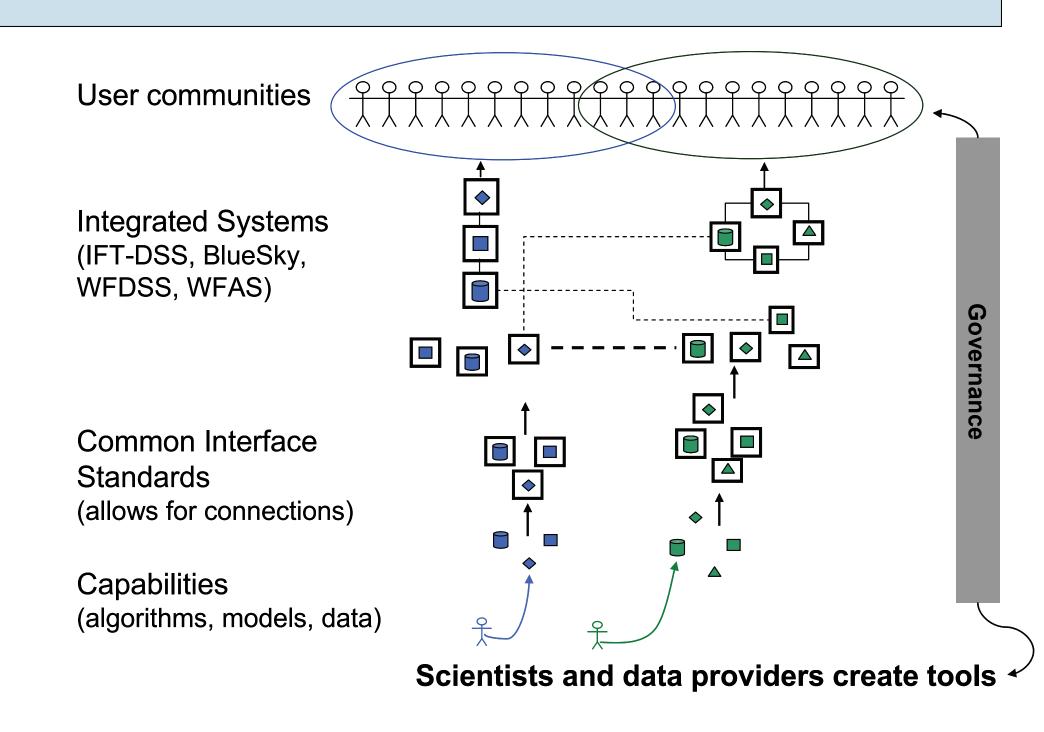
DISCUSSION

One of the strategic goals of the STS Study is to create a streamlined approach for developing and organizing fire and fuels software applications and making them more readily available to the user community.

The vision is that a small number of broad-scope collaborative SOA

systems

Next



(e.g., WFDSS, BlueSky, IFT-DSS) can organize and make available all or most of the software tools used in the fire and fuels domain. Beginning with BlueSky for smoke modeling, WFDSS for real-time fire response planning, and IFT-DSS for fuels treatment analysis and planning, the same software architecture can be used to address other focus areas within the fire and fuels arena.

ACCESS TO THE IFT-DSS

IFT-DSS Proof of Concept System

Access to the IFT-DSS proof of concept system is available at:

http://iftdss.sonomatech.com

The Software Systems and Tools Study Website

Access to the IFT-DSS graphical user interface mock-ups is available at:

http://frames.nbii.gov/jfsp/sts_study

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