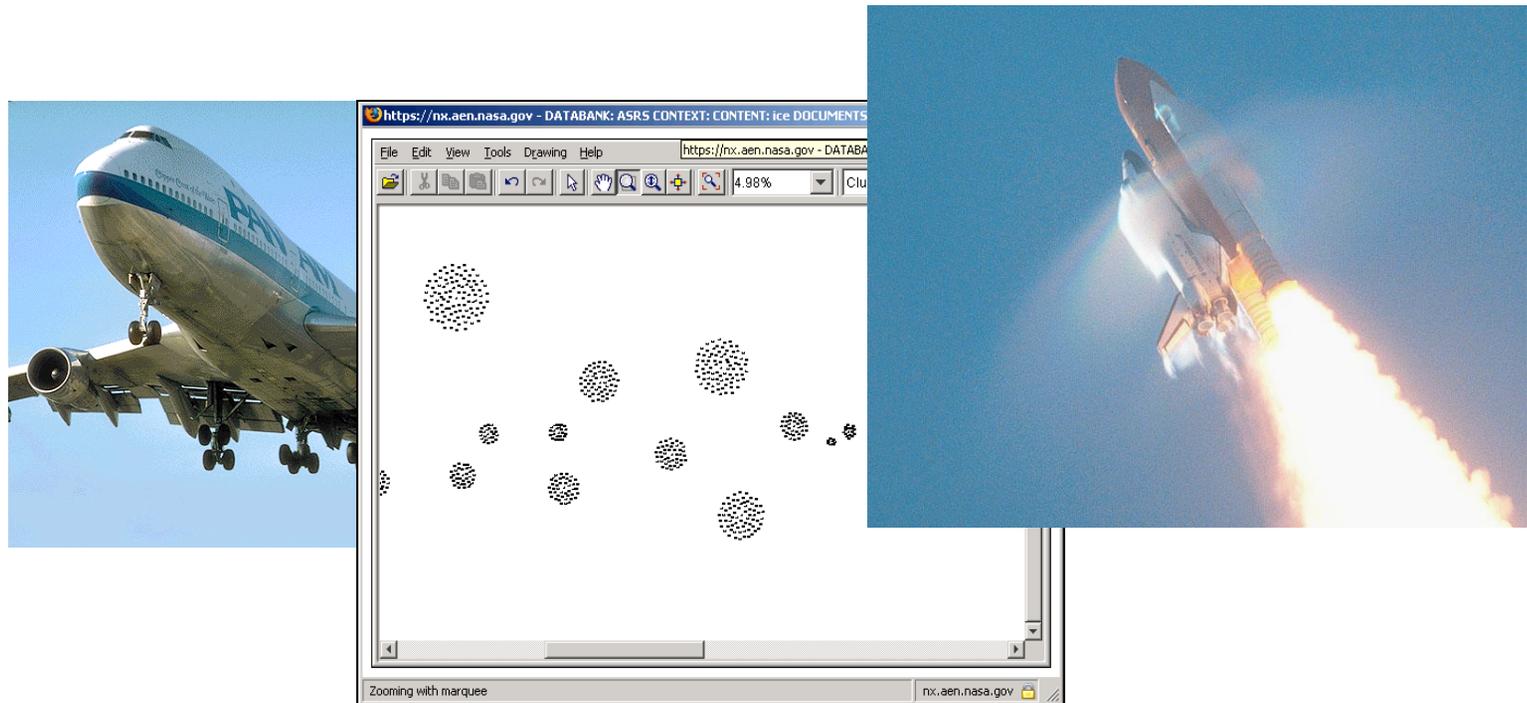


Data Mining @ NASA

Lead: Ashok Srivastava, PhD

IDU Group Mission

The Intelligent Data Understanding Group develops methods and technologies in machine learning and knowledge discovery (Data Mining) to address data intensive problems in various fields but with a specific focus on Integrated Vehicle Health Management. We are involved in projects that range from basic research in algorithms to very applied projects such as helping Airlines classify text reports and analyzing space shuttle data.



The IVHM project is made up of 6 diverse elements: Airframe Health Management, Propulsion Health Management, Aircraft Systems, Verification and Validation, Systems Analysis and Integration, and Data Mining and Information Analysis

These elements work in concert to develop technologies to determine system/component degradation and damage early enough to prevent or gracefully recover from in-flight failures in both the near-future and next-generation air transportation systems, and to provide enabling technology for space exploration.



The Integrated Vehicle Health Management Project is a part of the NASA Aviation Safety Program.

Aviation Safety Program Goals



IVHM Data Mining Lab

Goals

Overarching Mission

The lab enables the dissemination of Integrated Vehicle Health Management data, algorithms, and results to the public. It will serve as a national asset for research and development of discovery algorithms for detection, diagnosis, prognosis, and prediction for NASA missions.

Primary goals

Tools for Research
Algorithm development research for IVHM related problems.

Outreach
To other Data Miners, Subject Matter Experts, and the general public.

Accomplished by:

Using the lab as a tool to aid in Data Mining/IVHM research

Website

Collaboration



Website

To allow DMers and IVHMers to communicate. To provide a forum where other SME can see if our work is similar to theirs.

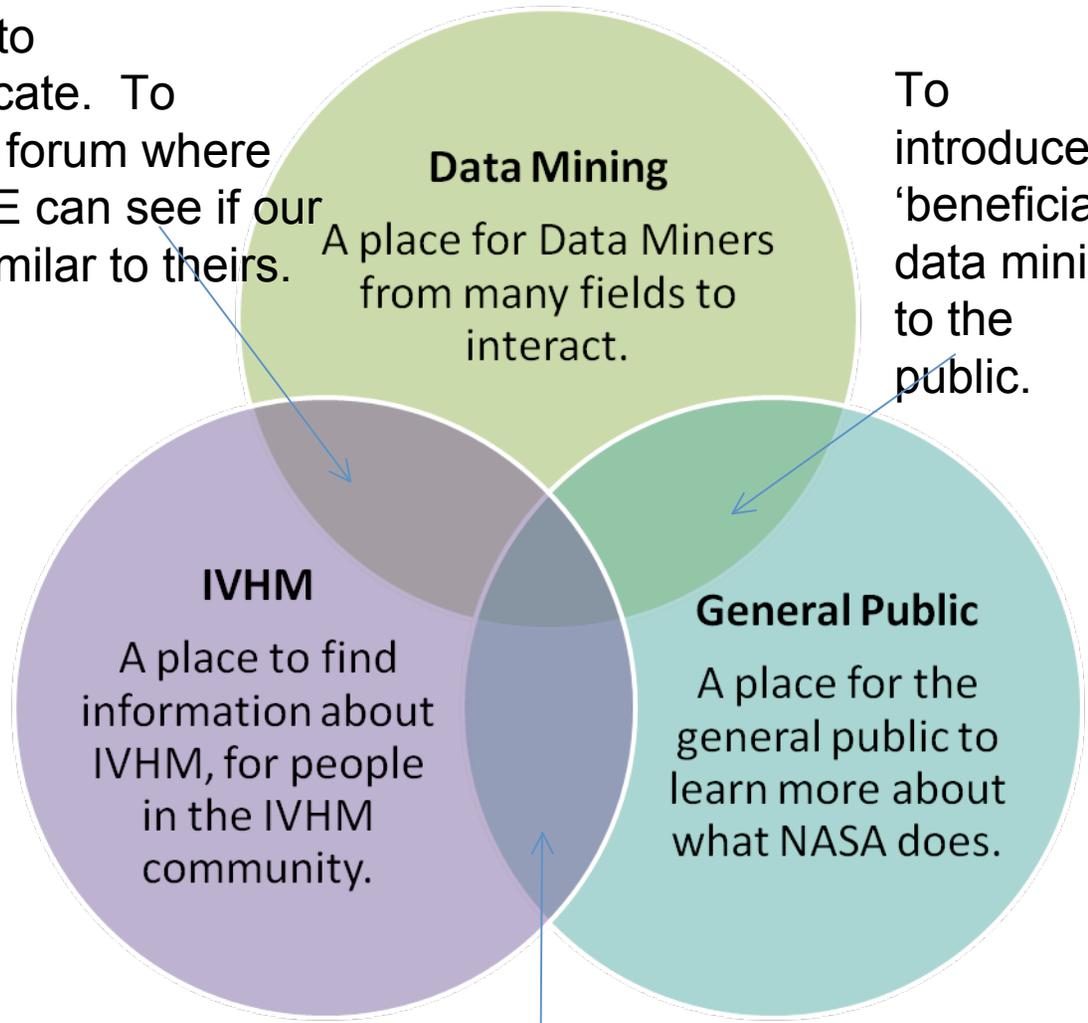
Data Mining
A place for Data Miners from many fields to interact.

To introduce 'beneficial' data mining to the public.

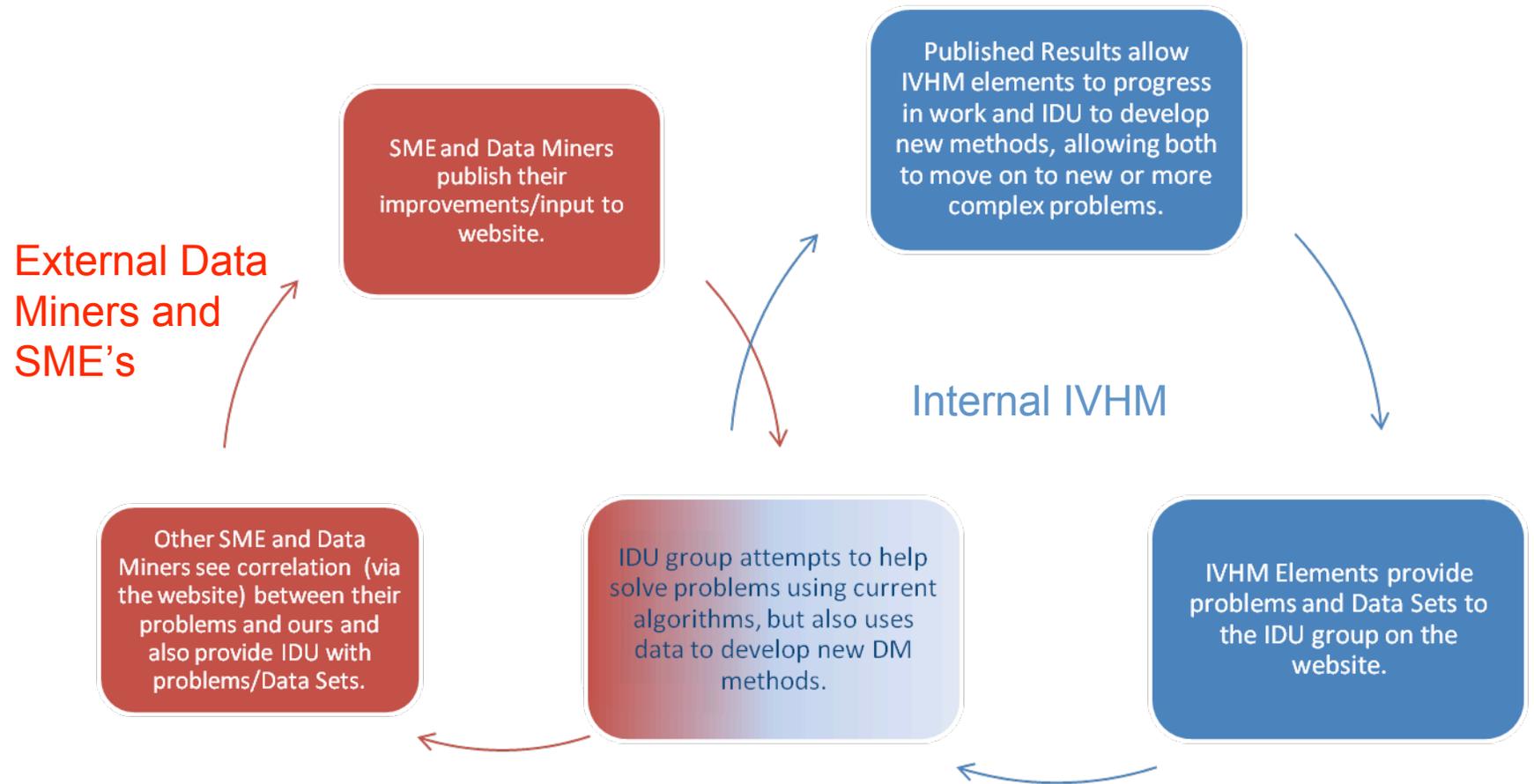
IVHM
A place to find information about IVHM, for people in the IVHM community.

General Public
A place for the general public to learn more about what NASA does.

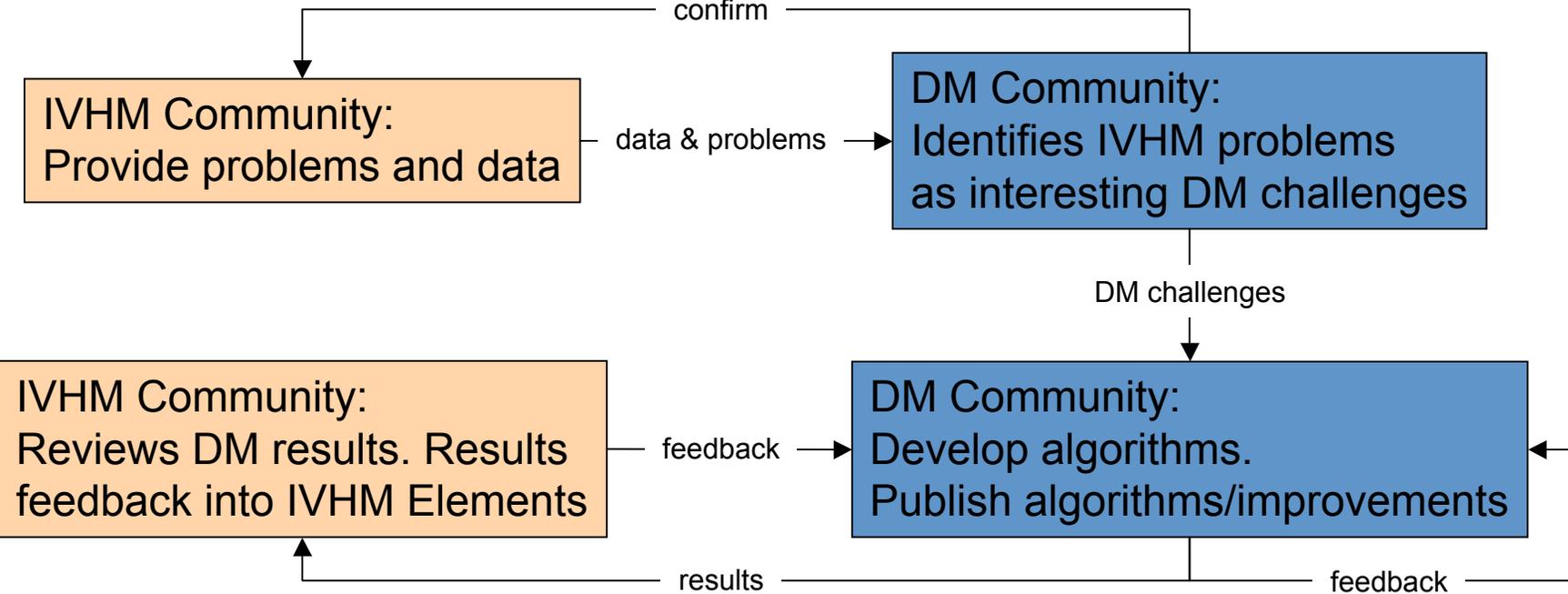
Information about how IVHM relates to Aviation Safety.



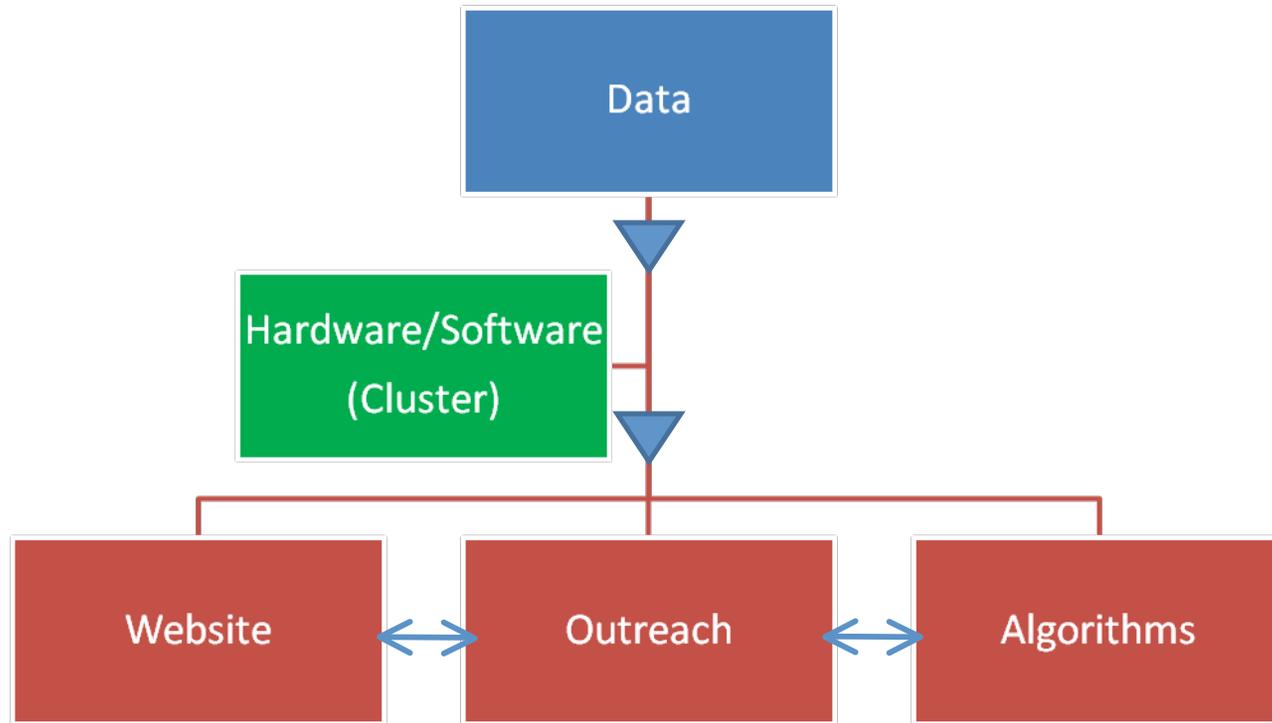
Using the Website for Collaboration/Research



IVHM DM Lab Website Flowchart



Work Elements



Desired Positive Externalities

Teaching the public about what NASA does

“Making NASA cool again” to young potential hires.

Good PR for NASA

Excellent forum for interaction with external organizations

Major Challenges

- Making a site that both appeals to the general public but is useful for scientists/engineers. This may require two linked sites.
- Working through NASA's opensource process.
- Making our data/algorithms appealing to non-aeronautics types.
- Data Cleansing.