Space Human Factors Engineering Requirements Database

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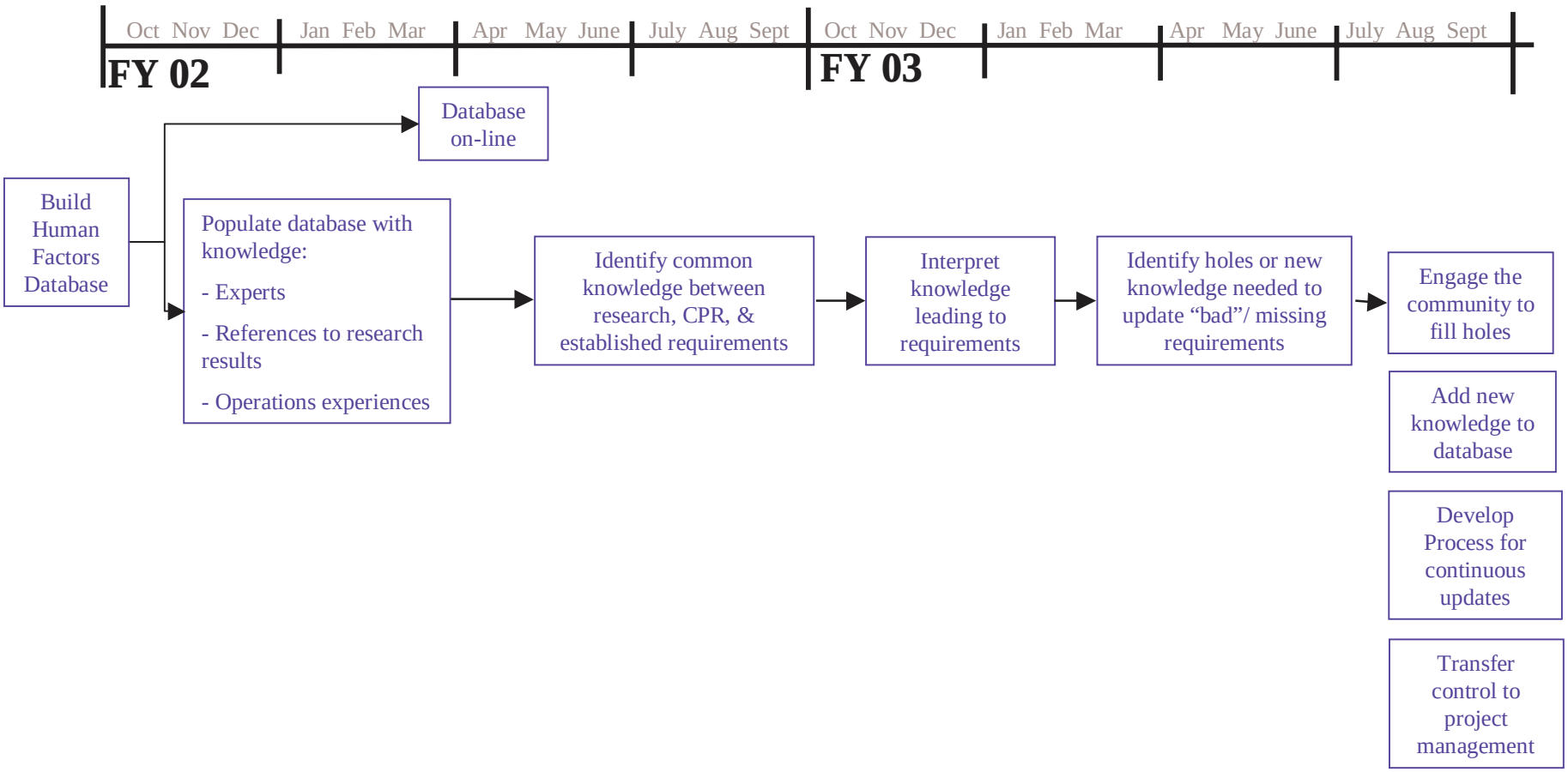
Project Plan

Project title: Space Human Factors Engineering (SHFE) Database

Project focus shifted slightly from developing requirements to developing a repository of information:

- Identify holes or new knowledge needed to update “bad” or missing requirements.
- Engage the community to fill holes.
- Incorporate new knowledge into database.
- Interpret new knowledge leading to requirements.
- Develop process for continuous update and configuration management of database.

Schedule


Oct Nov Dec
Jan Feb Mar
Apr May June
July Aug Sept
Oct Nov Dec
Jan Feb Mar
Apr May June
July Aug Sept
FY 02
FY 03
Build Human Factors Database
Database on-line
Populate database with knowledge:
- Experts
- References to research results
- Operations experiences
Identify common knowledge between research, CPR, & established requirements
Interpret knowledge leading to requirements
Identify holes or new knowledge needed to update "bad"/ missing requirements
Engage the community to fill holes
Add new knowledge to database
Develop Process for continuous updates
Transfer control to project management

Milestones

FY02:

- Web site available to public.
- Public review of web content.
- Database maintenance and revision of structure to reflect content.
- Identify links between knowledge, Critical Path Roadmap, and existing requirements.
- Subject matter experts and applicable publications were identified and incorporated into database.
- Agreement of participation from participants. Experts will be contacted and invited to participate in upcoming reviews. Plans for upcoming reviews will be completed. *(delayed to FY03)*

Milestones (continued)

FY03:

- Interpret knowledge leading to requirements.
- Identify holes or new knowledge needed to update “bad” or missing requirements.
- Engage the community to fill holes. *Agreement of participation from participants. Experts will be contacted and invited to participate in upcoming reviews.*
- Incorporate new knowledge into database.
- Interpret new knowledge leading to requirements.
- Develop process for continuous update and configuration management of database.
- Tracking system complete. Transfer of control to SHFE project management for further development and use.

Accomplishments to Date

FY02:

- The hardware and software for the database has been installed and prepared for public access.
- The database structure was completed.
- The web site has been published for intranet users. It is on the verge of being published for internet users. The website URL will be: http://shfe.jsc.nasa.gov
- Source information and reference experts were obtained and added to the database.
- Subject matter experts and applicable publications were identified and incorporated into database.

Background Charts

Introduction

•Future human-based space missions will have durations many times longer than even the currently anticipated ISS missions, and communications with the ground will be very limited.

•The level of isolation and autonomy will be far greater than in any previous space missions.

•Equipment and habitat design, supplies, training materials, and crew operations must be planned on the basis of the best available information from numerous disciplines, including human factors, biomechanics, education, cognitive and social psychology, and physiology.

•New technologies developing before the mission must be tracked and their human interfaces understood.

•Automation and intelligent systems will play a major role in this type of mission, and the allocation of tasks, responsibilities, and time to various players – human or machine – must be based on the best information available.

•Planning for long-duration missions involves developing the human systems design requirements that are necessary to maintain human system performance during all phases of the mission, including all anticipated changes in crew performance.

System Description

•A database and tracking system is being developed to capture the interrelationships of research in a variety of fields and enable human factors engineers to locate and retrieve results from other disciplines.

•The database will capture:

- information about human performance and its dependence on the environment
- information about who is doing relevant research
- what experts are available to interpret it
- when significant changes in knowledge or technology make previous requirements obsolete.

•This capability to link information to sources is a key feature of this program.

System Description (cont)

•The database is designed to contain five major classes of information.

(1) The first class contains the information or requirements needed to answer critical questions and resolve issues within the requirements.

(2) The second class contains known requirements that are well established and based on factors that are not expected to change, such as the amount of lighting or oxygen required by crewmembers.

(3) The third class contains information relevant to human-system requirements, such as findings from published research.

(4) The fourth class contains draft requirements that must be reviewed by the community before being established a new requirement.

(5) The fifth class contains information on sources of new data that may lead to a change in requirements.

- This includes names and contact information of individuals responsible for specific research and development in areas of human factors.

- It also includes links to web sites that feature information on specific research and development topics.

Conclusion

•The database and tracking system will ensure that engineers have immediate access to human systems design requirements necessary to maintain performance during all phases of the mission.

•This will significantly reduce the risk of mission failure or loss of crew life due to human systems design.

•This database will be an ongoing tool for tracking and integrating knowledge in space human factors throughout the years.