The idea for this cooperative began in 1997 when Walt Gillette (now the 747X program manager Boeing Commercial Airplanes) met for a Texas A&M College of Engineering, Advisory Council meeting. B. Don. Russell, the A&M Associate Dean in charge of TEES, briefed Walt Gillette on a new research cooperative A&M had recently established for the petroleum industry. Walt was intrigued by the possibility of linking several industry members to do cooperative R&D under the protection of the National Cooperative Research and Production Act of 1993.

Walt Gillette wanted to improve the research for aircraft systems -- an area he believed was a problem in Boeing's efforts to effectively design and build new commercial aircraft. These complex and expensive systems typically pace airplane programs.

Walt's vision is to use AVSI as a vehicle to work with experts throughout the industry (Commercial and Defense), academia and elsewhere. Everyone will benefit by leveraging resources and developing an improved ability to work together.
SAVI is a very ambitious, multi-year project to develop and demonstrate a “virtual integration” approach to product development that is likely to significantly affect how the aerospace industry handles embedded software-intensive systems in the future. The key concept is to address integration issues earlier and more comprehensively with improved consistent processes and tools.
Current membership suggests the strong leanings toward avionics and electronic systems. Government agencies (FAA and NASA) typically join as Liaison Members, under a change to the original agreement that essentially allows such members to behave as full members with recognition that their interests are public in nature and are not profit-motivated.
AFE 57 Plan - Software and Systems Integration and Verification

- Overall Concept of Operations
  - Design and production based on early and continuous integration (virtual => physical)
  - Integrate, then build

- Objective
  - Shift architecting, design, and production activities to explicitly address integration issues early, reducing program execution risks, cycle time and cost

- Approach
  - Adopt/develop “integration-based” software and system development processes with emphasis on integrating component-based, model-based and proof-based development

Expanded objectives from the current draft AFE 60
The sketch emphasizes that subsystems and systems are built up from components that are composable.
Expected Cost / Schedule Impacts

- SAVI project scope
- SAVI project impact

- Plus
- Production
- Cost Savings

xx% lead time reduction

Slide 6
A modification to the approach of developing complex systems is anticipated, placing the emph
The benefits of such a model-based development are summarized on this chart - cost savings.
This chart starts on the left with the repository of models and background data in the integrat
In an earlier phase of the project AADL was chosen as the best starting point

• Language features
• Tool support (existing)
• Extensibility support (AADL is good, not perfect)
Why AVSI?

- Rapid technological advancement and obsolescence combined with increasingly complex hardware and software evolution present integration problems affecting all of us
  - *It’s not going to get better, it’s only going to get worse*
    - Boeing and Airbus have published data showing doubling of size and complexity every two years
  - *We can’t afford to solve it alone*
  - *We can’t afford to solve it multiple times*
  - *We can’t afford not to solve it*
Why AVSI?

- We need industry-wide, reusable solutions to be developed, maintained, evolved, and cost-effectively applied to multiple projects by a variety of users
  - Solutions require a combination of research and pragmatic experience (Industry & Academia)
  - Solutions require a balance between development and regulation (Industry & Government)
  - Solutions require broad buy-in (Industry & Standards)

- Partnership is only viable approach to the common problem
Backup Slides
This chart illustrates four types of multiple-aspect models used to carry out this scheme of cont:

The overall effort is broken down into eight work packages in the expectation that each work package is likely to have its own set of interested participants and one or more AFEs to complete their tasks. Some work packages will underpin or overarch the whole project - like WP0, which sets the management structure for this multifaceted project. Similarly, WP6 and WP7 are concerned with how to adapt infrastructure to this style of model-based development.

There are a lot of interactions between the subtasks of the different WPs. The work is planned to take 3+ years to perform, and is split into five phases: red label preparation, red label execution (initial pilot project), red label assessment and revision for black label (i.e., preparation), black label execution (final pilot project), black label validation (assessment) and production preparation. Red label execution will be performed mainly by researchers, and will use proof-of-concept prototype tools, some of which may just be paper procedures. Black-label execution will be performed mainly by program people and will use pre-production tools.
Preliminary Work Products