



Project Management Shared Experiences Program PMSEP 6 Catalyst Bed Testing at SSC

September 11, 2002



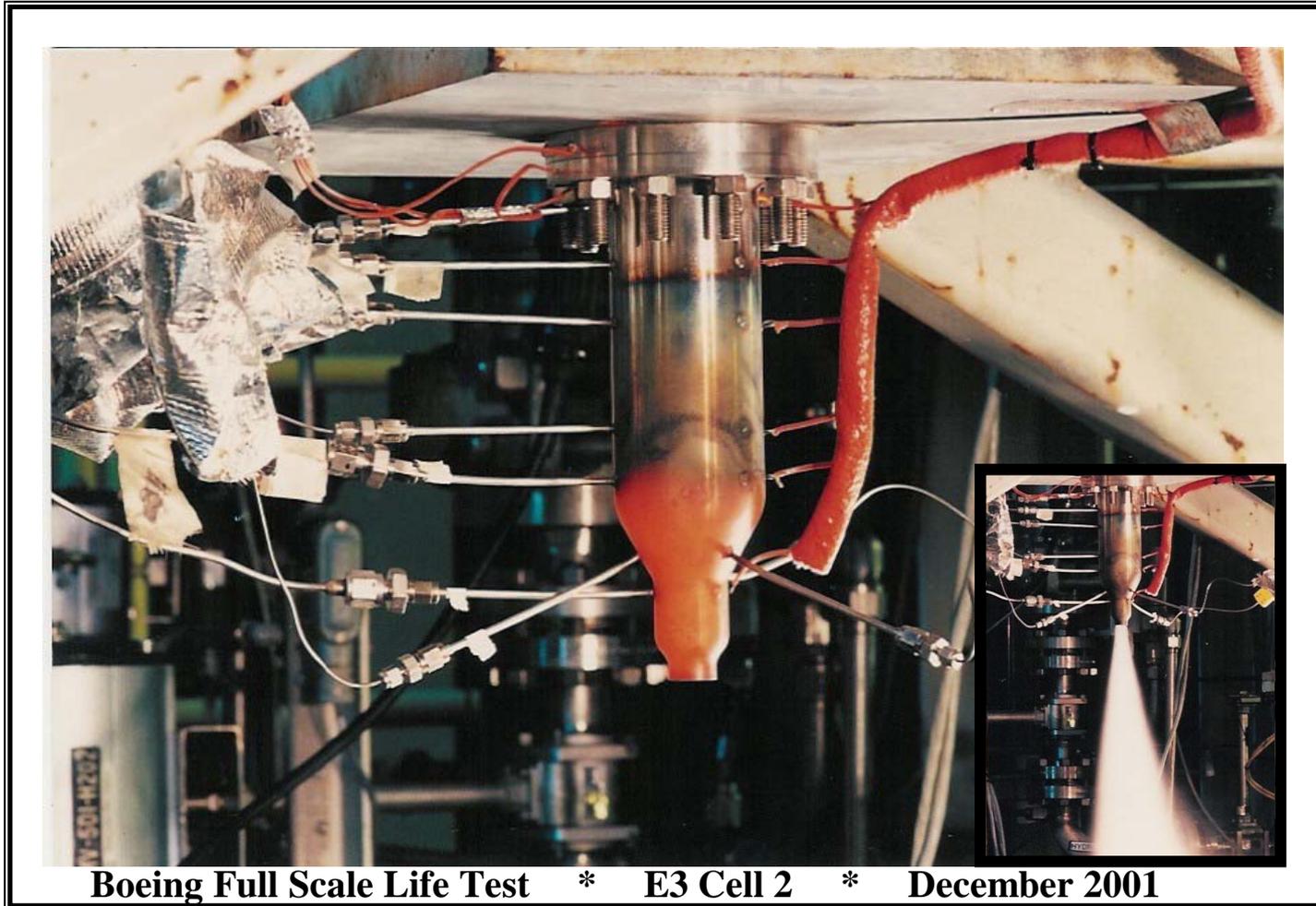
Agenda



- Project Overview
- SSC Customer Scorecard
- PMSEP Metrics – Quality of Results, Effective Cost Management, Effective Schedule Management, Customer Enthusiasm, Team Passion & Growth, Innovative Approaches, Responding to Crises
- Reasons for Success – PM Perspective
- Management Philosophy
- Summary



Project Overview





Project Overview



- Description – Testing of an advanced catalyst bed designed and fabricated by Boeing Rocketdyne through a cooperative agreement (NCC8-193) with NASA MSFC. The catalyst bed was designed to decompose highly concentrated hydrogen peroxide into gaseous steam and oxygen. The decomposition products can be used to drive a gas turbine, provide thrust as a monopropellant, or as an oxidizer for bi-propellant engine.
- Contract Value – \$430K for SSC test services
- Schedule – Three phases of testing beginning in November 2000, June 2001, October 2001
- Tests – Phase 1 – 57, Phase 2 – 110, Phase 3 - 269



SSC Customer Scorecard



- 13 questions with multiple choice answers – Very Positive, Positive, Neutral, Negative, Very Negative and space for comments
- Questions
 - Overall effectiveness in meeting technical requirements
 - Consistent and reliable control of requirements
 - Quality, accuracy, and timeliness of delivered test article
 - Strict control of proprietary data
 - Consistent, reliable cost estimates
 - Cost performance
 - Effective, user friendly processes
 - Single point of entry to NASA test services
 - Clear communication via single point of contact
 - Flexibility and responsiveness
 - Overall impression of testing



PMSEP Performance Metrics



Quality of Results

- Customer was able to demonstrate greater than twice the design life of the device
- Testing was conducted in off design conditions that provided useful data to DOD
- Customer Evaluation – Very Positive, test data (results) were delivered immediately after test and was of excellent quality



PMSEP Performance Metrics



Effective Cost Management

- Original project budget was \$332K final cost was \$430K
- 30% cost overrun
 - Scope - fabrication of additional hardware at the completion of Phase 1
 - Scope - additional testing due to success of project
 - Procedures changed in Phase 3 testing significantly increasing manpower requirements
- Customer Evaluation – Very Positive, committed to performance on cost and never wasteful of time or money



PMSEP Performance Metrics



Effective Schedule Management

- Phase 1 start and finish on schedule, incident occurred on last test of series
- Phase 2 started 2 days late and finished 13 days ahead of schedule
- Phase 3 started 18 days late and required 15 days longer than expected
 - Late start driven by an incident investigation resulting in an extensive review of all H₂O₂ operations at SSC
 - 269 tests were completed and 233 were planned
- Customer Evaluation – Very Positive, schedule held true to estimates over the entire time



PMSEP Performance Metrics



Customer Enthusiasm

- On site customer representatives, Program Manager, and Senior Management at Boeing provided very positive feedback
- Customer Evaluation – Overall Impression Very Positive, superb effort in achieving all milestones and objectives... engineering expertise, attention to detail and concern for safe tests were as impressive as any test operation we have ever been involved with



PMSEP Performance Metrics



Team Passion & Growth

- All procedures were carefully scrutinized as a result of the extensive incident investigation prior to Phase 3 testing
- Three personnel were trained to become Test Conductors over the course of the project
- Team passion was present and expressed in a comment section by the customer – the SSC team gave it their all to get planned tests off each night...occasionally working extremely late nights just to prevent a slip in schedule



PMSEP Performance Metrics



Innovative Approaches

- There were no singular innovative approaches to a particular technical challenge, there were numerous solutions to problems that occur as summed up by a customer comment- when changes needed to be made to the facility or control system, everyone helped offer creative solutions and everyone knew what was involved in fixing the problems



PMSEP Performance Metrics



Responding to Crises

- This project endured three incident investigations and only one of the incidents was associated with the project
 - Explosive event damaging the test article at the completion of Phase 1 testing, no personnel injured
 - Hydrogen peroxide storage container problem prior to the start of Phase 2 testing, no personnel injured
 - Explosive event from a hydrogen peroxide tank/transfer system prior to the start of Phase 3 testing, no personnel injured
- Numerous action items resulted from an extensive investigation in the last incident
- The team worked the items with a genuine sense of urgency to minimize the impact to the project
- Actions could have taken months to resolve but the open items were closed effectively and completely by the team in weeks to keep the project on track



Reasons for Success



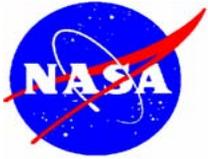
- Well defined requirements from the customer
- Team commitment to do a good job
- Cooperative environment between team and customer
- Team enjoys their work and camaraderie
- Team success is more important than individual recognition
- Genuine respect and appreciation of individual team members



R. Ross Management Philosophy



- Values of Honesty, Respect, Ownership, Accountability, Honor, and Integrity are expected of PM and team members, applies equally to all
- Say what you do and do what you say, motto used to reinforce ownership and accountability
- Plans/schedules are aggressive but realistic and built with input from the team
 - task duration and manpower requirements are determined by those that know it best
 - PM commitment to team that durations & manpower will not be changed without special consideration and discussion, PM will take responsibility for task completion if necessary
 - individual team members are identified as the contact responsible for task accomplishment and tracking
- Actively work and manage things within project control and deal with those that are not
- Focus on the real goals – detailed plan/schedule requires the team to think about the tasks and provide a blueprint for success, unknowns are embedded in every project and schedules may slip, slip in task completion is acceptable for rationale reasons, team commitment and resolve to work the issues is the ultimate goal
- Communicate with team, management, and customer consistently
- Remember the good and bad management techniques over a 15 year period as a practicing engineer and never never repeat the bad techniques



Summary



- The catalyst bed project was a small project \$430K
- Management issues for larger projects are more complex
- Core reasons for success of the catalyst bed project apply to any project
 - dedicated well trained operations team
 - commitment to customer satisfaction
 - team empowered to make decisions and adapt to situations as they arise
 - environment that promotes teamwork and values people