Stennis Space Center
Test Operations Contract
Overview
22 April 2010
SSC Test Operations Contract

Agenda

- 8:30 - 9:30  Registration
- 9:30 - 9:40  Welcome, Patrick E. Scheuermann, Director, SSC
- 9:40 - 9:50  Welcome, Roger Simpson, RPT Program Manager
- 9:50 - 10:00 Contract Overview, James Huk, Contracting Officer
- 10:00 - 10:45 Technical Overview, John Stealey, Engineering and Test Directorate
- 11:00 - 12:30 Test Area Tour, David Failla, Terry Addlesperger, Kerry Klein, Donna Dubuisson
- 1:00 - 2:30  Test Area Tour (if required)
- 1:00 - 2:00  Cost Volume Overview, Stan Gill, Robert Lisy
**SSC Test Operations Contract**

**General**

- **Current Contract**
  - In place since 2004
  - The contract provides test, test support services, and maintenance support at both the Stennis Space Center (SSC) and the Marshall Space Flight Center (MSFC)
  - Final option year of a six (6) year contract

- **Proposed Contract**
  - Draft RFP issued April 8\(^{th}\) 2010
  - Base Period of 32 months {three (3) contract years} and one (1) two (2) year option
  - Resulting Contract will be a Cost-Plus-Award-Fee
  - Questions/Comments due NLT April 29\(^{th}\) 2010
  - RFP is scheduled to be released on or about May 27\(^{th}\) 2010
SSC Test Operations Contract
SSC Test Stand Layout
SSC Test Operations Contract
SSC Test Stands

A-1
A-2
E-1
E-2
B-1/B-2
E-3
TEST STAND CAPABILITIES:
Design thrust capability of 1.5 M-lb
Flame Deflector Cooling 220,000 gal/min
Deluge System 75,000 gal/min
Data measurement system
High-pressure gas distribution systems
LOX and LH2 propellant supply systems
Hazardous gas and fire detection systems
Barge unloading capability (2 LOX, 2 LH)
Diffuser (A-2)
**SSC Test Operations Contract**

**SSC B-Complex (B-1 & B-2)**

**TEST STAND CAPABILITIES:**
- Thrust capability of 13 M-lb (original design)
- Flame Deflector Cooling 330,000 gal/min
- Deluge System 123,000 gal/min
- Data measurement system
- Two derricks – 175 ton and 200 ton
- High-pressure gas distribution systems
- LOX and LH2 propellant supply systems
- Hazardous gas and fire detection systems
- Barge unloading capability (3 LOX, 3 LH)

B-2 Test of Delta IV Common Booster Core

B-1 Test of Delta IV RS-68
SSC Test Operations Contract
SSC E-Complex

Stennis Space Center
General Pressure Capabilities
• LO$_2$/LH$_2$ ~ 8,500 psi
• RP ~ 8500 psi
• GN/GH ~ 15,000 psi
• Ghe ~ 10,000 psi

E1 Cell 1
Primarily Designed for Pressure-Fed LO$_2$/LH$_2$/RP & Hybrid-Based Articles
Thrust Loads up to 1.2M lb$_f$

E1 Cell 2
Designed for LH$_2$ Turbopump & Preburner Assembly Testing
Gas Generator testing capability
Thrust Loads up to 60K lb$_f$

E1 Cell 3
Designed for LO$_2$ Turbopump & Preburner Assembly Testing
Used for Engine Level Testing
Thrust Loads up to 250klb$_f$
Upgraded for Vertical Engine Testing
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SSC E-1 Testing

- **250 Klbf Hybrid**
  - 4 tests (1999, 2001)

- **TRW 650K TCA Hot-Fire**
  - 15 tests (Summer 2000)

- **IPD (250K-scale) LOX Pump Cold-Flow**
  - (Fall 2002)

- **IPD Preburner Hot Fire**
  - 9 tests (Sep - Oct 2002)

- **IPD LOX Pump Hot Fire**
  - 12 tests (Mar - May 2003)

- **IPD LH Pump Hot Fire**
  - 6 tests (Sept - Oct 2003)

- **IPD Engine Tests**
  - 2006
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SSC E-Complex (E-2)

E2 Cell 1
Primarily Designed for Pressure-Fed
LO$_2$/RP1 Based Test Articles
Thrust Loads up to 100K lb$_f$ (horizontal)
LO$_2$/RP1/IPA $\sim$ 8500 psi
GN/GH $\sim$ 15000 psi
Hot GH (6000 psi/1300 F)
Instrumentation Test Apparatus
6000 psi (LN)

E2 Cell 2
Designed for LO$_2$/H2O2/RP1
Engine/Stage Test Articles
Loads up to 328K lb$_f$
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SSC E-2 Testing

E2 Cell 1 Test History
(Originally High Heat Flux Facility)

CJTA – Small composite tank cryogenic tests (LH2)
Multilobe – Dual lobe composite tank cryogenic tests (LH2)
   SLIC-57 – GH2/LH2 turbo pump
RS-76 – Oxygen rich subscale pre-burner
PHUS – Hydrogen Peroxide hybrid
LR-89 – LOX/RP-1 Thrust Chamber
RS84 – Oxygen rich subscale pre-burner
ITA – Instrumentation Test Apparatus
CSG – LOX/IPA Chemical Steam Generator

E2 Cell 2 Test History
(Originally Designed for PTA/MCI)

MC1 – LOX/RP1 60 Klbf Engine (Cancelled)
Excalibur – LOX/RP1 75 Klbf Pressure Fed Engine (Cancelled)
USFE – H2O2/JP8 Stage (Cancelled)
ETFT – External Tank Frost Test
ETDT – External Tank Diffuser Test
SSC Test Operations Contract
SSC E-2 Testing
E3 Test Stand Capabilities

Designed for Rocket Engine Component & Sub-Scale Engine Development

E3 Cell 1

Horizontal Test Cell
Propellants: LO₂, GOX, JP-8, GH₂
Gases: LN₂, GN₂, Ghe
Thrust Loads up to 60K lbₜ

E3 Cell 2

Vertical Test Cell
Propellants: LO₂, H₂O₂, JP-8, LCH4, GH2
Gases: LN₂, GN₂, Ghe
Thrust Loads up to 25K lbₜ
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SSC E-3 Testing

Miscellaneous small scale LOX/GOX Hybrid 1998
HYSR - LOX Hybrid Sounding Rocket - 1999
OSC - 1999/2000
AR2-3 - H2O2 & JP8 - 2000
Pratt and Whitney Catalyst Bed Testing - 2000
PPES - Portable Peroxide Enrichment Skid - 2001
BRHI - Hypergolic Injector - 2003
MK67 - H2O2 Turbo Pump - 2003
HTTP - LOX Hybrid Technology - 2004
HMTP – GOX/LOX Hybrid Technology -2005
MTTP – GOX/GCH4 Thruster - 2006
Advent – LOX/LCH4 Thrust Chamber – 2006
TGV – LOX/JP-8 Thrust Chamber – 2007
SDT - A3 Subscale Diffuser Test – 2008/2009
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SSC E-3 Testing

Stennis Space Center
SSC Test Operations Contract
SSC Test Support Facilities

Cryogenic Propellant Storage Facility
High Pressure Industrial Water (HPIW)

High Pressure Gas Facility (HPGF)
Fluid Component Processing Facility (FCPF)
Cryogenic Operations Area

Bulk Liquid Oxygen (LOX) Storage
Supplied by Vendor via Trucks
Loaded Directly to Barge
Six (6) Transfer Barges
105,000 Gallons (95,000 Usable)

Bulk Liquid Hydrogen (LH2) Storage
600,000 Gallon Storage Sphere (vendor owned)
Supplied by Vendor via Trucks
Loaded into Storage Sphere or Directly to Barge
Three (3) Transfer Barges
270,000 Gallons (240,000 Usable)
SSC Test Operations Contract
SSC High Pressure Industrial Water (HPIW)

High Pressure Industrial Water
Furnishes water to the "A" and "B" Test Complexes
Test stand Deflector Coolant
Fire Protection (Deluge)
Diffuser Operation (A-2)
Propellant Barges (LH2) Fire Protection

HPIW Reservoir
800 ft diameter
66 million gallon (26 M-gal usable)
Filled from the SSC canal system (four Pumps)

HPIW Pumping System
Two (2) electric motor-driven pumps (Jockey Pumps)
Maintains System Pressure
Supports Small Usages (i.e. Barges)

Ten (10) diesel motor-driven pumps
33,385 gallons per minute each
~330,000 gallons per minute total

Emergency Power-Generating System
Provides Emergency Electrical Power A/B Test Complex and
High Pressures Gas Facility (FY2010)
Four (4) Diesel-driven Generators
Synchronized or Independent of Utility-fed Circuits
SSC Test Operations Contract
SSC High Pressure Gas Facility (HPGF)

**Gaseous Nitrogen (GN2)**
- 2,400 - 4,400 psig
- Delivered to SSC via Truck (Liquid)
- Six (6) Kobe / Two (2) ACD Pumping System

**Gaseous Hydrogen (GH2)**
- 2,200 - 3,000 psig
- Delivered to SSC via Truck (Liquid)
- Two (2) Cryogenic Reciprocating Pumps

**Gaseous Helium (GHe)**
- 2,000 - 4500 psig
- Delivered to SSC via Truck (Gaseous)
- One (1) Clark and Two (2) Henderson Compressors

**High Pressure Missile Grade Air (HPA)**
- 1,500 - 2,800 psig
- Atmospheric Air Compressed
- Three (3) Cooper Compressors

High Pressure Gas Facility (HPGF)
**SSC Test Operations Contract**

**Fluid Component Processing Facility (FCPF)**

**Shop Services**
- Assembly of components performed inside a clean room
- Cryogenic testing of components, up to 30 in. in diameter, can be performed down to -320 °F using LN2
- Hydrostatic testing can be performed up to 30,000 psi and pneumatic testing up to 15,000 psi

**Shop Support Services**
- Component Engineering
- Material Compatibility
- Failure Analysis
- Improvement Modifications
- Spares Provisioning
- Technical Support
- Specification Development

**Fluid Component Processing Facility (FCPF)**
Test/Support Area Tour

Lunch

Cost Sheet Overview
Thank You for Your Participation