

PART ONE

Technical Capabilities

Equipment and Tooling

Samson Metal & Machine, Inc. has a complete inventory of fabricating, machining and assembling equipment. Below is an overview of our major equipment and processes.

Machining/Turning - Turning operations include grooving, knurling, internal and external Threading (standard, metric and acme), facing and boring. Operations are performed on conventional and CNC lathes. Samson's' CNC programming and set up methods allow for machining of prototype and small run parts as well as large quantity production runs. Various materials turned include carbon steels, stainless and chrome alloy steels, aluminum, magnesium, titanium, Teflon, UHMW and Phenolic.

Conventional Lathe: Swift - 48" cut, 360" centers

CNC Lathe: Mazak - 14" cut, 60" centers

Vertical Lathe: G&L, 84" cut

Conventional Lathes: up to 36" cut x 240" centers

Milling - Boring, drilling, tapping, facing and contouring operations are performed on conventional and CNC milling centers. All machines are equipped with digital readouts to insure accuracy.

Conventional Milling Center: G&L #5 Taper, 120" table

CNC VTL's: Mazak, Victor up to 44" x 23" workspace

Grinding - Grinding capabilities include surface and O.D. grinding to meet high tolerance and various finish requirements.

O.D. Grinder: 10" diameter x 26" long

Surface Grinder: 6" wide x 18" long

Keying/Splining - Internal and external keyways and splines are cut using conventional machines and processes. Multiple angle milling heads allow for angled grooves in bores as small as 3" diameter. Samson has a variety of Woodruff key cutters and broaches.

Portable Boring - A portable boring unit is used to bore on-site equipment such as frames, heavy equipment and machinery that cannot be readily disassembled. Boring capacity is 8" diameter.

Tooling - Samson Metal & Machine, Inc. has a full stock of quality tooling for both conventional and CNC machine work. Tooling includes end mills, drills, shell mills, boring bars,

boring and facing heads, radius cutters, indexing tables, tapping heads, insert tooling and tailstocks. In addition various machining fixtures, indexing plates and tool holders have been designed by Samson's engineers to increase production rates and expand machine capacities without sacrificing quality or accuracy.

Fabrication

Cutting/Sawing - Available cutting equipment includes friction saws, cold cut band saws, air-arc, oxy-acetylene and plasma torches.

Plasma/Oxy-acetylene Machine: NC controlled 96" wide x 144" long

Shearing - Shears are available for shearing carbon steels, aluminum and stainless steels in thickness ranging from 22 gage sheet to 3/4" plate.

Shear: HTC 3/4" plate shear

Punching/Coping - Equipment includes punches for holes, slots, notches, forming and pipe coping.

Rolling - Rolling capacity of 1/2" plate 60" wide

Break Forming - Samson Metal & Machine, Inc.' forming equipment includes conventional box and pan breaks to 1/2" capacity and a 200 ton press break with 1" plate capacity.

Pipe and Tube Bending - Pipe and tube bending machines allow for forming of components up to 4" diameter.

Welding - Welding machines are configured for SMAW, GTAW and GMAW processes. Equipment is capable of manual and semi-automatic processes.

Inspection

Measuring Equipment - Samson Metal & Machine, Inc. has a full inventory of measuring equipment to insure that the requirements of each contract are met. Equipment is controlled by the Quality Department and is identified and calibrated and traceable to NIST standards on a regular basis. The following is a partial list of the available equipment:

Micrometers from 0" to 36"
Vernier Calipers from 0" to 42"
Complete set of plug gauges
Internal and external thread gauges
Electronic Profilometer - Surface Tester

Coatings thickness gauge for ferrous and non-ferrous materials
Radius gauges
Dynamometer up to 10 tons
Hydrostatic pressure testing equipment up to 4000 psi
Granite surface plates, 18" x 24" and 36" x 48"
Complete set of bore gauges up to 10"
Parallels
Ultrasound test equipment
Hardness tester

Miscellaneous

Fixturing Plate - Fixturing for component fit-up, welding and component assembly includes a 96" x 240" base plate with T-slots.

Static Balancing - Equipment for balancing of impellers, shafts and screws.

Blasting - Sand and glass bead blasting equipment.

Coating - Airless and conventional coating equipment, including a 12' x 40' paint booth.

Radial Drill Press - Carlton radial arm drill, #5 taper, 84" arm.

Shop Space - **Main Shop**-30,000 square feet
Combee Road Annex-50,000 square feet
Main Shop Addition-transition will soon begin to an additional 23,000 square foot facility directly west of our existing facility.

Assembly Room - 500 square feet of clean assembly room

Forklifts - 2 ton and 3 ton

Overhead Cranes - **Main Shop**-1 each 10 ton, 3 each 5 ton
Combee Road Annex-2 each 20 ton, 1 each 5 ton
Main Shop Addition-3 each 5 ton

Transportation - 1 ton and 8 ton flatbeds

Test Weights - 40,000 lbs.

Support Tasks

In order to meet the needs of our customers, Samson Metal & Machine, Inc. has developed a quality program that insures quality products and services. Added support from engineering and

procurement departments, allows Samson Metal & Machine, Inc. to provide solutions that meet the customer's product, cost and delivery requirements.

Quality Assurance

Specifications - Our quality program is in accordance with NASA NHB 5300.4(1c), NQA1, MIL-STD-45662 and MIL-I-45208A.

ISO 9002 – As of September 16, 1998 Samson Metal & Machine completed its initial audit and has been awarded 9002 Certification.

Continual Improvement - All personnel are dedicated to providing material, equipment and services that meet the highest levels of quality. All employees are members of quality teams that meet on a regular basis to learn new ways to provide better products.

Quality Tasks - Quality assurance monitors projects from the planning stage to every aspect of the contract until product is shipped and accepted by the customer. Task responsibility for Quality Control includes but is not limited to the following:

Contract Review - Together with project management and production personnel, quality control is responsible for the initial review of the contract requirements. This review is performed to identify critical dimensions and features, specifications and procedures, processing and inspection equipment and standards of workmanship needed to meet the contract requirements.

Inspection Plan - A detailed inspection plan including receiving inspection, in process and final inspection of parts and assemblies and hold points both in-house and customer generated is created by Quality Control. The noted inspection points and hold points are then incorporated into shop travelers and manufacturing plans to insure that inspections are performed at the correct time.

Receiving/Shipping Inspection

Quality personnel. All inspection equipment is calibrated and labeled on a regular basis per our quality manual requirements. Only certified, calibrated instruments are used for inspections. Calibration records are available at all times for our customer's review.

Drawing Control - An updated drawing control log is kept throughout each contract to insure that production personnel have current revisions. In addition a set of red-lined "as-built" drawings is maintained as a master copy.

Inspections - In-process and final inspections are performed by trained Quality personnel using calibrated equipment. Detailed inspection logs are kept and are traceable to parts and features.

Monitoring of Vendors - Samson Metal & Machine, Inc. Quality monitors vendors of products and services to insure that all sub-contracted items meet or exceed the contract requirements.

ADP Maintenance - An acceptance data package is maintained throughout the length of the contract. The ADP is available at all times for customer review and is current with contract progress at all times. The ADP will include as a minimum:

1. All Requests for Information
2. All Deviations and Waivers
3. Welding Procedures
4. Welding Inspection Records
5. Welding Inspector Certifications and Qualifications
6. NACE Inspection Records
7. Proofload and Operational Test Procedures
8. Final Acceptance Test Records
9. Inspection Logs
10. Manufacturer's Data
11. Calibration Records
12. Operations & Maintenance Manuals

13. Spare Parts Lists and Data
14. Shop and "As Built" Drawings
15. Commercial Warranties
16. Material Certifications & Test Reports
17. Certificates of Compliance

Specifications and Standards - Maintenance of current revisions of all applicable industry and military standards.

Control of Weld Inspections - Quality is responsible for insuring that all welds meet the identified standards. This includes responsibility for weld inspections, weld map control and maintenance of welding certifications, procedures and inspector qualifications.

Material Control - Material is controlled to insure that the correct materials and components are used in assemblies. Quality Control must release materials for production. All Government and Customer furnished equipment is maintained in a secured area by the quality department.

Test Procedures - Samson Metal & Machine, Inc. quality will work with project management to prepare all applicable test procedures and test record logs.

Purchasing Review - All requisitions for materials and services must be reviewed and approved by Quality.

Design and Drafting Capabilities

Engineering - Samson Metal & Machine, Inc. personnel includes three mechanical engineers with over fifty years of experience in mechanical systems design. Past design projects have included fixed and mobile platforms, mixers, pressure vessels, piping systems, skids, transfer carts and rail systems, structural towers and packaging equipment. All Samson Metal & Machine, Inc. engineers are skilled in computer drafting software. For design of electrical systems, Samson Metal & Machine, Inc. has established reliable vendors.

Drafting - Samson Metal & Machine, Inc. has one full-time draftsman. Equipment includes Inkjet plotters, Blue-line generators and scanners. Software includes Autocad, Cadkey, Geocam and Autodraw. Samson can import drawings and models in a variety of formats including scanning and translation of scaled drawings.

Procurement Methods

Quoting - Quotation requisitions are checked by quality control and then submitted to procurement personnel. Quotations are obtained from approved vendors. Special care is taken to identify minimum purchase quantities and quoted delivery times.

Purchasing for Contracts - Purchasing requisitions are prepared by project management and approved by quality. These requisitions are submitted to procurement where confirmation of quoted prices, quantities and delivery schedules are obtained from vendors. Purchase orders are then issued to vendors. Purchase orders contain all applicable requirements for materials and services and are controlled by sequential numbers and project numbers.

In-House Manufacturing Processes

Machining - All machining operations including milling, drilling, threading, tapping, facing, boring, knurling, grinding, turning, bearing and insert installation, keying and splining will be performed by Samson Metal & Machine, Inc. personnel. Samson Machinists are experienced in all types of component fits, assembly techniques and in the repair and modification of existing equipment and hardware.

Fabrication - Fabrication of components from raw stock to fit-up of components will be performed by Samson Metal & Machine, Inc. personnel. Processes include grinding, sawing, burning, shearing, punching, breaking, rolling and lay-out.

Welding - All welding will be performed by certified welders. Welders are experienced and certified in all processes and materials including aluminum, carbon steels, stainless and chrome alloy steels and titanium.

Blasting/Coating - In-house blasting processes include bead and sand blasting. Coating processes include all types of paint such as epoxy, polyurethane, zinc, enamel and high temperature coatings.

Assembly - Final assembly of mechanical and electrical systems is performed in-house. Samson Metal & Machine, Inc. assembly experience includes mechanical, bearing, pump, pin, gear, rail, motor, special component and plastics assembly. Various types of bonding and caulking procedures are also performed in-house.

Testing - All proofload, operational and pressure testing is done in-house.

Finishing/Cleaning - Polishing, abrasive finishing and cleaning of components and assemblies.

Subcontracted Manufacturing Processes

Samson Metal & Machine, Inc. has established a large base of reliable vendors and subcontractors to perform special processes and services. Subcontractors are monitored by our Quality department and only approved vendors are used. The following processes are subcontracted:

Laser/Waterjet Cutting
Heat Treating
NDE (Weld Inspection)
Cable Manufacturing
Plating
Large Component Machining*

Anodic Coatings
EDM
Electrical (Design and Manufacturing)
Electronics (Design and Manufacturing)
Cable Proofloading/Tagging
Material Testing

* Samson Metal & Machine, Inc. has several vendors that provide quality machining of large, oversized weldments. When Samson Metal & Machine, Inc.'s machining capacities will not allow for processes on large weldments, with customer approval, these items are sub-contracted. Several of these vendors have been used on past NASA contracts with successful results.

List of Subcontractors

Laser/Waterjet Cutting

Infinity Manufactured Industries	Largo, FL	(813)532-4453
Tampa Bay Laser	Tampa, FL	(813)621-5377

Anodic Coatings/Plating

Orlando Plating	Orlando, FL	(800)462-1268
-----------------	-------------	---------------

Heat Treating

Suncoast Heat Treat	Orlando, FL	(407)843-7145
---------------------	-------------	---------------

EDM

Suncoast Tool & Gage	Clearwater, FL	(813)572-8000
Florida Discharge Machining	Clearwater, FL	(813)572-4229

NDE (Welding Inspection)

Law Engineering Tampa, FL (813)289-0750

Electrical/Electronics Design & Manufacturing

Guardian Manufacturing Rockledge, FL (407)631-4580

CASE Engineering Lakeland, FL (941)687-7580

Cable Manufacturing/Proofload Tagging

Certified Slings Tampa, FL (800)229-7546

Large Component Machining

Alabama Dynamics Calera, AL (205)668-0708

Florida Machine Mulberry, FL (941)533-0326

Project Management Capabilities

Samson's project managers have over eighty years of combined experience in the industry, including management of projects for the entertainment, nuclear, power generation and aerospace industries. Samson currently has five project managers on staff.

Project Management Tasks

Drawing/Contract Review - Project managers and quality perform the initial review of the contract and drawings to identify components, procedures, processes and means of fabrication and machining.

Scheduling - Project managers are responsible for creating an initial production schedule and working with production personnel to insure that all scheduled activities are completed on time. Schedules are updated weekly and are submitted per the contract requirements on a monthly basis.

Material Take-offs - Initial material take-offs and preparation of purchasing requisitions are completed by the project manager. Decisions on best material sizes and shapes for components are coordinated with production personnel and engineering.

Manufacturing Plans/Travelers - Manufacturing travelers which show all processes and check points are created by project management. This task is coordinated with Quality Control to insure that all inspection hold points are noted.

Progress Reviews - Project managers are responsible for regular progress reviews. These reviews incorporate progress in production as well as required quality and manufacturing documentation. Reviews may be held at Samson facility with the customer's representatives. Updated schedules, RFI's,

Deviations, technical and contract issues will be discussed at each review. Graphical progress charts and schedules with narratives will be submitted as required. Samson's project managers are required to track progress on a weekly basis and should allow for informal updates to customers as required.

Technical Support - The assigned project manager will be the single point of technical contact for both the customer and Samson's production personnel.

Budgeting/Cost Control - Project managers are required to create a material and labor budget for each project and monitor the associated costs as the manufacturing progresses.

RFI's/Deviations - Writing of RFI's and Deviation/Waivers will be the responsibility of project management and will be coordinated with quality control to insure that all contract and technical requirements are satisfied.

Project Management Tools and Support - Samson has the needed tools to track quality, manufacturing progress and project costs. This allows project managers to make informed decisions and insures that customers have reliable updates and reviews. These tools include scheduling and reporting software, accounting reports and an in-house network for access to all project information and records. In addition, project managers are supported by upper management, production, accounting, purchasing and engineering so that quality requirements and production schedules can be met.

PART TWO
Past Performance of Ground Support Contracts

NASA

Kennedy Space Center, FL

Contact: Procurement, Denise K. Travers (407)967-7230

Contact: Engineering, Alan Littlefield (407)867-7589

Contract No. NAS10-12212

Contract Amount: \$1,023,000.00

Successfully Completed February 1995 thru July 1996

Rack Insertion Device (RID)

Contract was for a one of a kind equipment handling device to be used at Kennedy Space Center, Space Station Processing Facility (SSPF). The unit consisted of an assembly that included **rotation, vertical and horizontal translation on three different levels.** Various materials were fabricated and machined including stainless steels, carbon steels, aluminum and plastics. Processes performed included heat treating, painting, plating, EDM, sheet metal forming, plastics machining, modification of purchased components, blasting and **NACE inspected coatings.** Precision assembly included gears, bearings, reducers, motors, controllers, electrical panels, wiring and the **alignment of eight 120" long vertical bearing ways and a 168" diameter horizontal bearing way.** Ball screws and linear guide rail systems were assembled to provide for horizontal translation of the structure. The RID contract included **extensive electrical, proofload and operational testing. All testing was performed at Samson Metal & Machine, Inc. under a critical time schedule.** After testing was successfully completed, the RID was partially disassembled, packaged and shipped to KSC, FL. Samson Metal & Machine, Inc. also successfully quoted on and received and delivered an end effector for use with the RID as an addition to this contract.

NASA

Kennedy Space Center, FL

Contact: Procurement, Judy van Deutekom (407)867-7208

Contact: Engineering, Alan Littlefield (407)867-7589

Contract No. NAS10-12037

Contract Amount: \$344,205.00

Successfully Completed July 1993 through March 1994

ORU Handling Device

Contract consisted of a computer controlled telescoping boom of approximately 40 feet in length. Boom was of a fabricated box beam design and incorporated hardened bearing ways, limit devices and counterweights. Processes included blasting and coating, heat treating, lead forming and precision assembly of bearing ways. Samson Metal & Machine, Inc. engineers **also designed a spherical bearing mount to allow for proper boom alignment for the ORU.** This bearing mount design was approved and was incorporated into the ORU. Electrical, operational and proofload testing were performed at Samson Metal & Machine, Inc.' facility with special emphasis given to verifying boom deflections when extended. The ORU is housed inside the Rack Insertion Device in the SSPF and is used for manipulating space station hardware racks.

McDonnell Douglas

Kennedy Space Center, FL
Contact: Procurement, Scott Dieffenderfer (407)383-2960
Contract No. NAS10-11400
Contract Amount: \$455,274.00
Successfully Completed June 1994 through April 1995

Removable Overhead Access Platform (ROAP)

The Removable Overhead Access Platform (ROAP) and Contingency Access Boom (CAB), rides on the Launch Platform Integration Stand (LPIS) in the Space Station Processing Facility. The ROAP and CAB assembly is a **manually operated**, multiple workstation platform for accessing space station equipment in the LPIS. The manufacturing of the ROAP included machining of various materials (carbon steels, stainless steels, plastics) and assembly of mechanical components. Components included gears, hand cranks, power screws, hardened bearing ways and **aluminum handrails** and access ladders. Work platforms were designed to fold up for clearance and Samson Metal & Machine, Inc. **fabricated and machined these platforms including the hinges from aluminum**. Proofload and operational testing was performed at Samson Metal & Machine, Inc., and delivery made to Kennedy Space Center. **The contract also included on-site assembly and installation of the ROAP in the Space Station Processing Facility.**

The Boeing Company

Kennedy Space Center, FL

Contact: Procurement, Bill Makey 407-867-8115

Contract No. K10970011

Contract Amount: \$203,390.00

Successfully Completed between December 1997 through October 1998

50 INCH HATCH RACK HANDLING END EFFECTOR

The **Hatch Rack Handling End Effector Assembly** mounts to the end of the ORU which is mounted within the Rack Insertion Device. **This end effector is task specific for handling specific space station hardware racks.** The end effector assembly included a rotation joint with electrical controls, carry-on actuator and storage stand. **Extensive testing and proofloading** was accomplished at Samson Metal & Machine prior to delivery.

Pratt & Whitney/USBI

Kennedy Space Center, FL

Contact: Procurement, Frank Quiett (407) 853-9535

Contract No. POID 78409

Contract Amount: \$191,240.50.00

Successfully Completed between July 1997 and June 1998

Scissor Lifts, Two Each

The Scissor Lift is a device used as an internal work platform, accessing the walls of the solid rocket booster sections for cleaning and refurbishment. Components included scissor arms, bushings, pneumatic motors, machine screws and control/instrument tubing.

Extensive proofloading and operational testing was performed at Samson Metal & Machine, Inc., and delivery made to Kennedy Space Center.

The Boeing Company

Kennedy Space Center, FL

Contact: Procurement, Karen Heuer, 321-867-4492

Contract No. F04701-97-C-0005

Purchase Order No. K37990012

Contract Amount: \$3,946,023.00

Contract Start Date 7/30/99 with scheduled completion 2/28/02

CBC Aft/Forward/Forward Strapon Cradle and Pallets

The **CBC Cradle and Pallets** are used to support the Delta IV rockets from their manufacturing point in Huntsville, AL through their barge transit and to their final destinations at KSC and Vandenberg AFB, California. Upon arrival at their destination, a portion of the **Cradle and Pallet** system is used during the rotation of the rocket from the horizontal to the vertical position. This contract requires Samson to deliver **13 CBC Aft Cradle/Pallets, 7 Forward Cradle/Pallets, 6 Strap-on Forward Cradle/Pallets and 13 Constraint Rings** along with associated hardware and support equipment. Prior to the delivery of the first units in January of 2000, Samson was **required to design, fabricate and erect a complex test fixture** used to both proofload and functionally test all major equipment and components.