Calibration of the NASA LaRC NTF flow meters used for AFC and PAI.

There are 4 flow meters that are part of the new NTF "Model Flow Control and Propulsion" Air Station (ref. NTF drawing 1266872). There are two parallel legs that provide air to the Semi-span Model Support System (SMSS), a high mass flow (0 – 20 lbm/sec) and a low mass flow (0 – 10 lbm/sec). Each of these legs is subdivided into parallel lines to achieve an accurate control and low uncertainty of the mass flow measurement. Normal operations of the flow meters are for air at 1600 psia.

Calibration Requirements
The 4 vortex meters and associated piping will be presented for calibration as a system, (ref. NTF simplified drawing by GSJ).

Calibrations will be traceable to NIST and NVLAP/ISO 17025

1) Run a reduced uncertainty calibration with the calibrated transmitters and our measurement instrumentation over the full velocity range of each meter

2) Each flow meter calibration will be calibrated at constant pressure of 1600 psia.

3) Improved uncertainty will be achieved through calibration (measured mass flow (lbm.sec) uncertainty < 0.35% of reading) at least 12 data points and 6 repeat points will be taken across the velocity range (~ 5.0 to 100 ft/sec).

4) Each flow meter will be calibrated with associated pressure and temperature transmitters (GFE). The pressure and temperature transmitters will be calibrated prior to flow meter calibration.

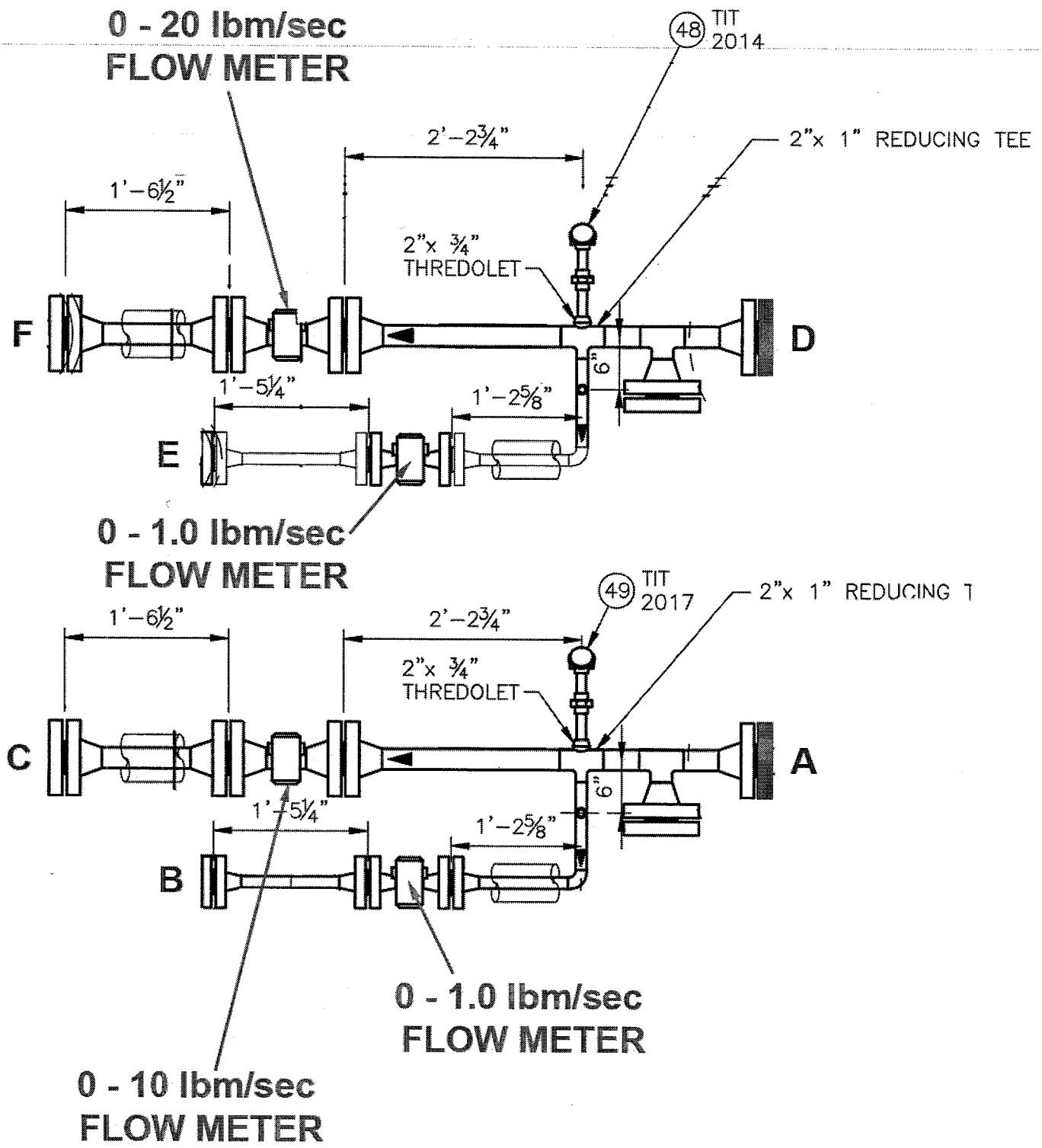
5) Provide calculations for the NASA flow computer or data acquisition system. The calibration will include a 4th order polynomial equation relating the flow meter output with mass flow rate (lbm/sec).

6) Provide an option of adjusting the k-factor. If an adjustment of the k-factor is made then a verification test will be performed similar to the "initial calibration (steps 1 -5)".

GFE Flow Meter Information

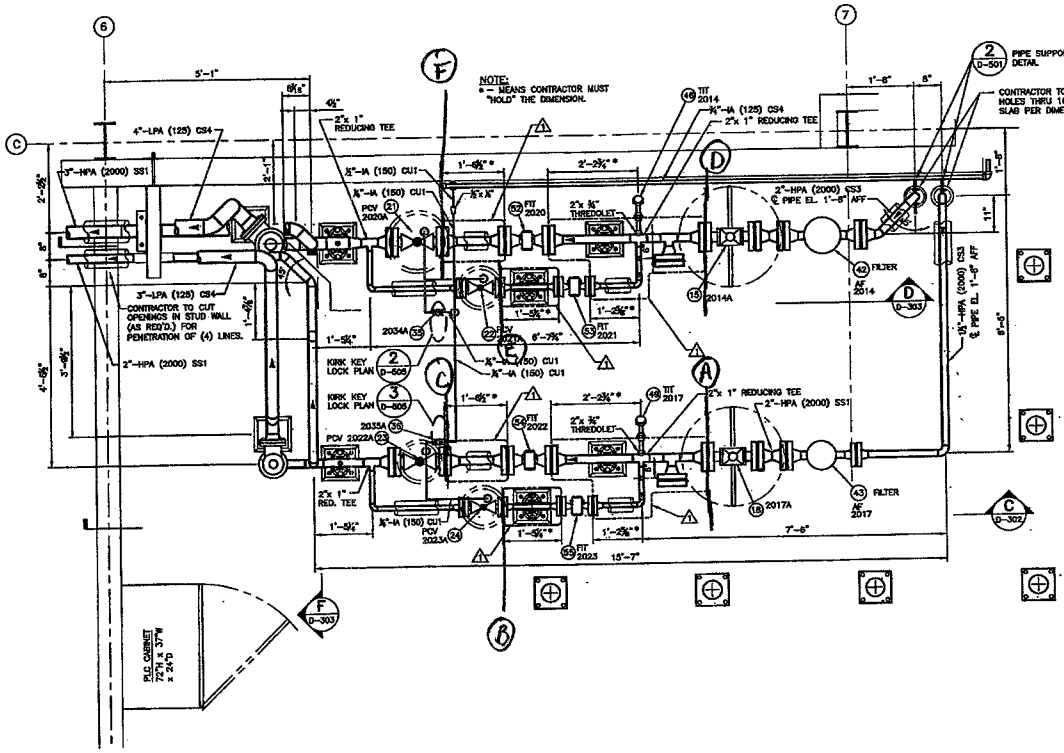
(2 each) Rosemount 8800D VORTEX FLOWMETER
Rosemount Description: 8800DR010SA7N1D1M5
Flange/Alignment Ring Size: ASME B16.5 (ANSI) RF Class 900
Line Size: 1 in. (25mm)

(2 each) Rosemount 8800D VORTEX FLOWMETER
Rosemount Description: 8800DF020SA7N1D1M5
Flange/Alignment Ring Size: ASME B16.5 (ANSI) RF Class 900
Line Size: 2 in. (50mm)

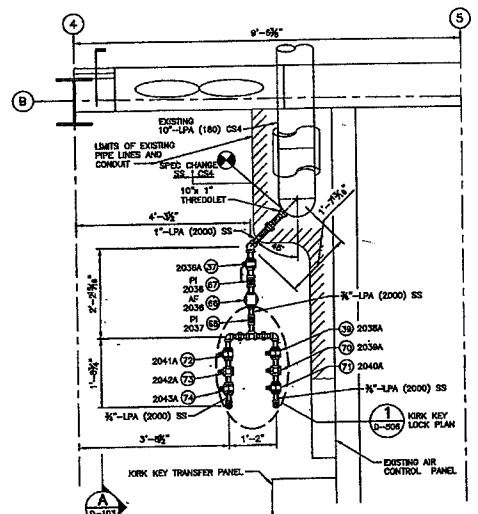

0 - 20 lbm/sec
FLOW METER
48 TIT 2014
2'–2¾"
2"x 1" REDUCING TEE
1'–6½"
2"x ¾"
THREDOLET
F
D
6"
1'–5¼"
1'–2⅝"
E
0 - 1.0 lbm/sec
FLOW METER
49 TIT 2017
2"x 1" REDUCING T
1'–6½"
2'–2¾"
2"x ¾"
THREDOLET
C
A
6"
1'–5¼"
1'–2⅝"
B
0 - 1.0 lbm/sec
FLOW METER
0 - 10 lbm/sec
FLOW METER

NOTES:

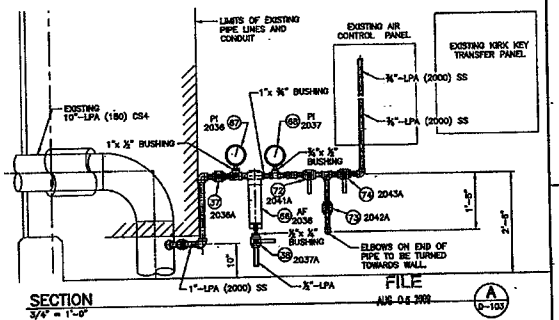
1. PIPE SPOOL PIECES REFERENCED TO THIS NOTE SHALL BE FABRICATED, X-RAYED, HYDROTESTED, PRECISION CLEANED AND DELIVERED TO THE GOVERNMENT AS EARLY AS POSSIBLE AFTER CONTRACT AWARD.



ENLARGED PIPING FIRST FLOOR PLAN / EL. +13'-6"
3/4" = 1'-0"



ENLARGED LPA PIPING PLAN
3/4" = 1'-0"



SECTION
3/4" = 1'-0"

FILE
AUG 0 6 2009

REVISIONS										REVISIONS									
DATE	LTR	FNCO	DESCRIPTION	BY	CHECK	APPR	DATE	LTR	FNCO	DESCRIPTION	BY	CHECK	APPR						

JACOBS
ROME GROUP
Langley Research Center
Hampton, VA 23681

APPROVALS	DATE
LDS/PDI	02/06/09
MAC/PDI	02/06/09
VLL/PDI	02/06/09
M. PALMER	02/06/09

APPROVALS			
NAME	ORGANIZATION	DATE	
		1/6/09	DESIGNED
		2/3/09	DRAWN
			CHECKED
		7/6/09	APPROVED
		2/16/09	MGR. PROJ. DEV.
		2/16/09	MGR. PROJ. MGT.

AE01202

FOR DRAWING INDEX SEE DRAWING 1266867 (0-001)

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
HAMPTON, VIRGINIA 23681-2199

PROJECT TITLE: MODEL FLOW CONTROL & PROPULSION SIMULATION CAPABILITY AT NTF

DRAWING TITLE: FIRST FLOOR PIPING ENLARGED PLANS AND SECTION

BUILDING NO. 1236 | SIZE D | DRAWING NO. 1266872 | SHEET NO. D-103 | REV. *