DTS Data Acquisition Background History

- 1998: TDAS PRO – 90 cm³/channel

- 2003: TDAS G5 – 3.5 cm³/channel

- 2008: Slice – 1.3 cm³/channel

Sled and Vehicle Crash

WorldSID and iDummy

Head and Leg Form
Slice Concepts

- Modular system – build from 3 to 30 channels in 3 channel Slices
- Plug multiple Bridge Slices onto Base Slice to make a Stack
- USB daisy-chain between Stacks and to PC
- Up to 100 KHz sampling per channel, 16 bit ADC
- Meets all requirements of SAE J211 and ISO 6487
- Up to 8 GB (soon 16 GB) flash memory (for a 6 channel system you could take data for 37 hours! at 10 KHz sampling)
- Almost 2 times smaller than any other competing data acquisition system
**Slice Design**

- **Base Slice**
  - 25 x 25 x 5 mm
  - Contains microprocessor, memory, USB 2.0 port and hub, power, trigger, and control
  - Other *Slices* stack on top of *Base Slice*

- Two redundant connections for daisy-chaining to other *Stacks* and connection to the PC
Slice Design

- **Bridge Slice**
  - 25 x 25 x 4 mm
  - 3 channels – independent 16 bit, 100 KHz ADCs
  - Factory settable for 2, 2.5, 3, or 5V sensor excitation
  - Designed to stack onto **Base Slice** or other **Bridge Slices**
  - Accommodates most common dummy sensor types

- Connect to sensors via shielded instrumentation cable
Slice Design

- **Stack**
  - Up to 10 Slices can be stacked onto Base Slice (30 channels – would be 45 mm high)
  - Two 2.5 mm or 4-40 bolts for connection and mounting

Example 6 channel system: 25 x 25 x 13 mm high
**Slice for Flex PLI**

- 1 to 4 *Slice Stacks* are mounted on the Flex and chained together
- The end of the chain is connected to T=0 switch
- The beginning of the chain is connected to the off-board PC via a quick disconnect

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PC provides power and USB control

Quick disconnect

Switch for T=0

Flex PLI
Slice for Flex PLI

- It is very important to consider the test sequence to assure reliable data collection

- Proposed Test Sequence
  - Position Flex on launch machine.
  - Connect quick disconnect and USB port of PC.
  - Arm Slice channels with Slice software. Note PC provides power for Slice and sensors until launch.
  - Launch Flex.
  - Slice automatically starts collecting data at 20 KHz when quick disconnect breaks.
  - Each Slice Stack has super capacitor for 5+ seconds of power. Note: super capacitor is recharged within minutes when reconnected to PC for next test.
  - All data stored to flash memory – no power needed to retain memory.
  - T=0 is marked in data when switch on Flex contacts vehicle.
  - After test, reconnect to USB port on PC and download data from Slice.
  - Slice software allows data viewing and export to ASCII or ISO.
Slice Development Schedule

- Originally designed for US Air Force in contract ending April 2008
- *Slice* design freeze for Flex PLI: March 21
- All drawings provided to FTSS: April 5
- Delivery of two 6 channel *Slice* units to FTSS: July 30
- Assist FTSS with testing: August-September
- Assist users with testing for duration of program
  - DTS has technical support offices in Japan, Germany, and Detroit
DTS ARS

- MEMs Device – DC response
- Range – Frequency Response
  - 300 deg/sec – Class 100
  - 1,500 deg/sec – Class 600
  - 12,000 deg/sec – Class 1000
  - 50,000 deg/sec – 10 Khz -3dB
- Input Voltage: 4.95V to 14V
- Output Voltage: ±2V
Slice for Flex PLI
31 March 2008

Thank You