



UniWest®

On the Leading Edge of Sensing Technology

Controllable Videoscopes/Sensors

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Session 4 - Technologies
Session 1, 4b-2*

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Who is UniWest ?

- Headquartered in Pasco, WA with offices in CA (Los Angeles), OH (Cincinnati), OK (Oklahoma City), and PA (Pittsburg) and GA (Atlanta)
- Established in 1984
- An advanced NDE Company, offering both eddy current and ultrasonic systems & equipment
- 100% employee owned
- Over \$8 million in annual sales & 46+ employees
- 2 facilities (30,000 sq ft facility space)
- ISO 9001 & AS 9100 Rev B certified
- Sales world-wide



Who are our Customers ?

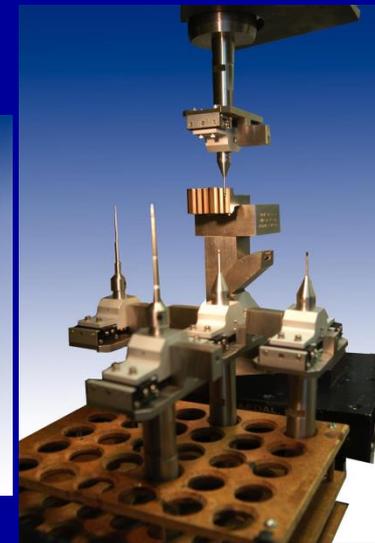
- Aerospace
- Metals producers
- Auto industries
- Power generation
- Nuclear industries
- Medical industries



What We Do

Design, fabricate and implement comprehensive NDI Solutions

- Instrumentation
- Systems
- Sensors
- Precision EDM notch standards
- Highly sophisticated deployment mechanisms & Customized solutions



Aerospace NDI – Propulsion

Safety

Engine Structural Deficiencies:

- o 1946.... Early Engines - 25 hours of life
- o 1952 Engine life up to 160 hours. of life
- o 1960's Continued inadequate life capabilities
- o 1973-1976 42 Aircraft lost.

Structures introduces ENSIP Concept

- Based on Damage Tolerance Approach
- DTA demands Quantification of NDI
- Based on Crack Propagation, forces Inspections
- US Military provides initial funding for E/C system develop. (GE ECI/ECII, P&W APEX/Anorad, Garrett Auto EC)

Cost Savings

Average price of rotating part = 50K

- o 999 good parts out of 1,000 are discarded based on conventional engine life mgmt.

Materials Lab introduces RFC Concept

- o Based on Fracture Mechanics and NDI
- o Developed Milestone in NDI Automation
(The RFC System)
- o MIL-HBK-1823

F100 fleet Grounded-Only engine for advanced fighter planes at the time

Benefits

- Assured LCF Life of Fracture Critical Comp.
- Sustained Weapon System Mission

Benefits

- o \simeq \$ 1 billion overhaul cost savings
- o 25:1 R.O.I.

Military Driven Inspection Systems – UniWest Signal Path



Pushing the Envelope - Detection Capability

Production

- *Materials: Ti 6-4, Ti 17B, Inco 718, HS718, R95, R88DT, Waspaloy, In100, Ti6242, R220C*
- *Flaw sizes @ 90/50 POD:*
 - *Holes: Typical - 0.009" x 0.009"*
Smallest - 0.005" x 0.005 (Ti 6-4)
 - *Surfaces: (Webs, Bores, Rabbets)*
Typical - 0.013" x 0.026" (Ti 6-4)
Smallest - 0.007" x 0.014" (R88)
 - *Complex: (Dovetails, Scallops, Shaped holes)*
Typical - 0.020" x 0.020" (Ti 6-4)
Smallest - 0.008" x 0.008 (R-88)

Aerospace NDI – Structures

**IMPROVING EDDY CURRENT
PROBABILTY OF DETECTION
OF AIRFRAME STRUCTURES**

**USAF Safety of Flight
Inspection (SOFI) Program**

SOFI Program - Scope

- USAF Development and Implementation of new NDI probe probe technology to Structures
- Phases – I, II, and III
- NDI Probe Inspection Reliability Assessment
- Probe deployment kits

USAF SOFI PHASE I

Air Frame	Totals # of NDI Procedures Reviewed and Modified
A-10	18
B-52	25
C-5	9
C-130	10
F-15	12
T-38	14
KC-135	5
Totals	93

Raised Head Fastener Kit



Surface Probe Kit



New Raised Head Fastener Probes



New surface Probes



USAF SOFI PHASE II

Air Frame	70 Procedures critical to Safety of Flight	43 Procedures impacting Mission Rediness after EN-SB-08-012 Compliance	19 Procedures for Economic Impact	Totals # of NDI Procedures Reviewed and Modified
B-52	17	0	0	17
C-5	3	7	3	13
C-130	9	16	8	33
F-15	0	4	1	5
F-16	0	14	0	14
H-1	0	2	0	2
KC-135	22	0	7	29
T-38	4	0	0	4
A-10	15	0	0	15
Totals	70	43	19	132

Application Specific RHF Probe Kit



2nd Surface Kit



Flush Fastener Kit



New Flexible Technology Probes



FET-3312,
30 deg Bend



FET-3313, .125" Radius
Offset coil Probe



FET-3307, .250" Radius
Swivel Probe

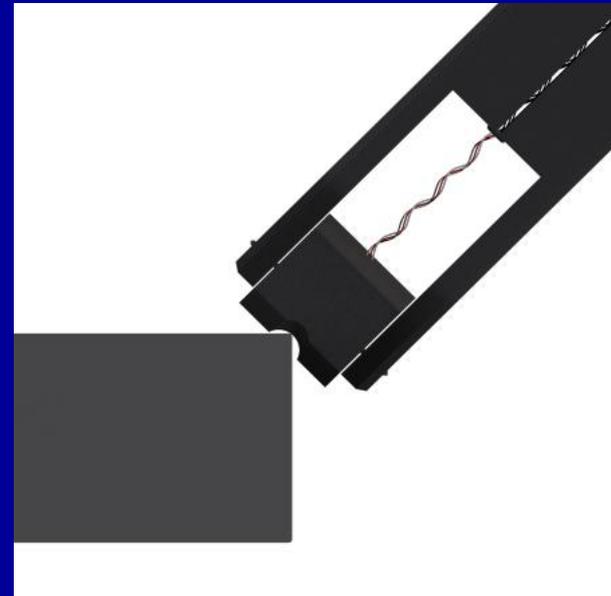
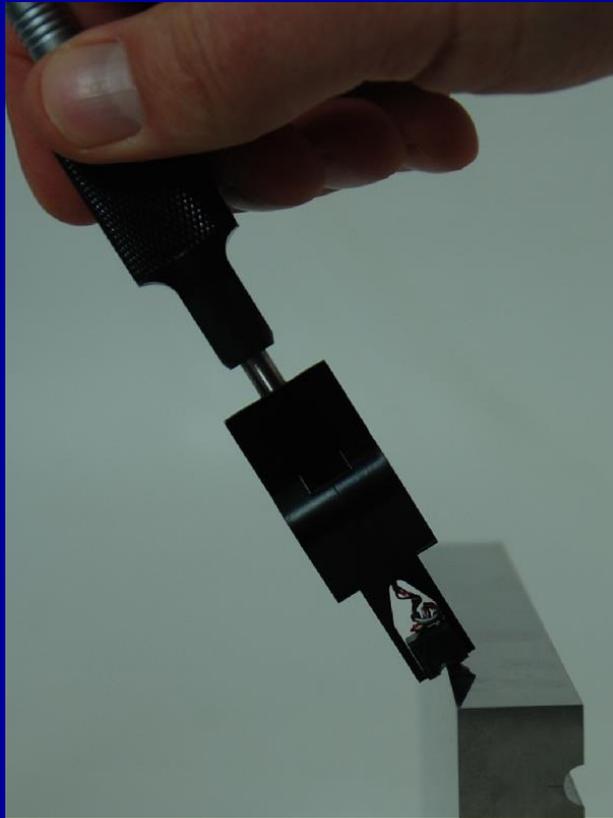


New Specialty Probes - Edge Probes



New Edge Probes

Impressive Eddy Current Field Coupling: 0.080" POD



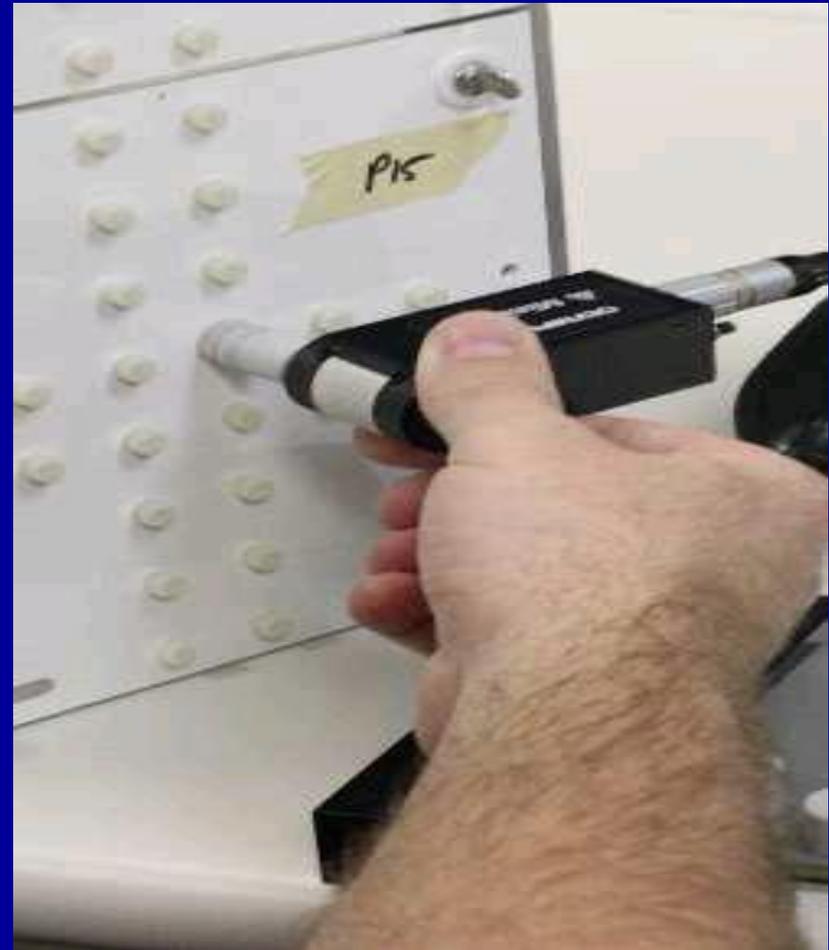
Other Specialty (Application Specific) Probes



Probability of Detection Demonstration

Std. Pencil Probe POD = 0.200"
fastener head overlap

RHF Probe POD = 0.100" +
fastener head overlap



USAF SOFI PHASE

KIT CONFIGURATION

EXAMPLE OF A DDK KIT

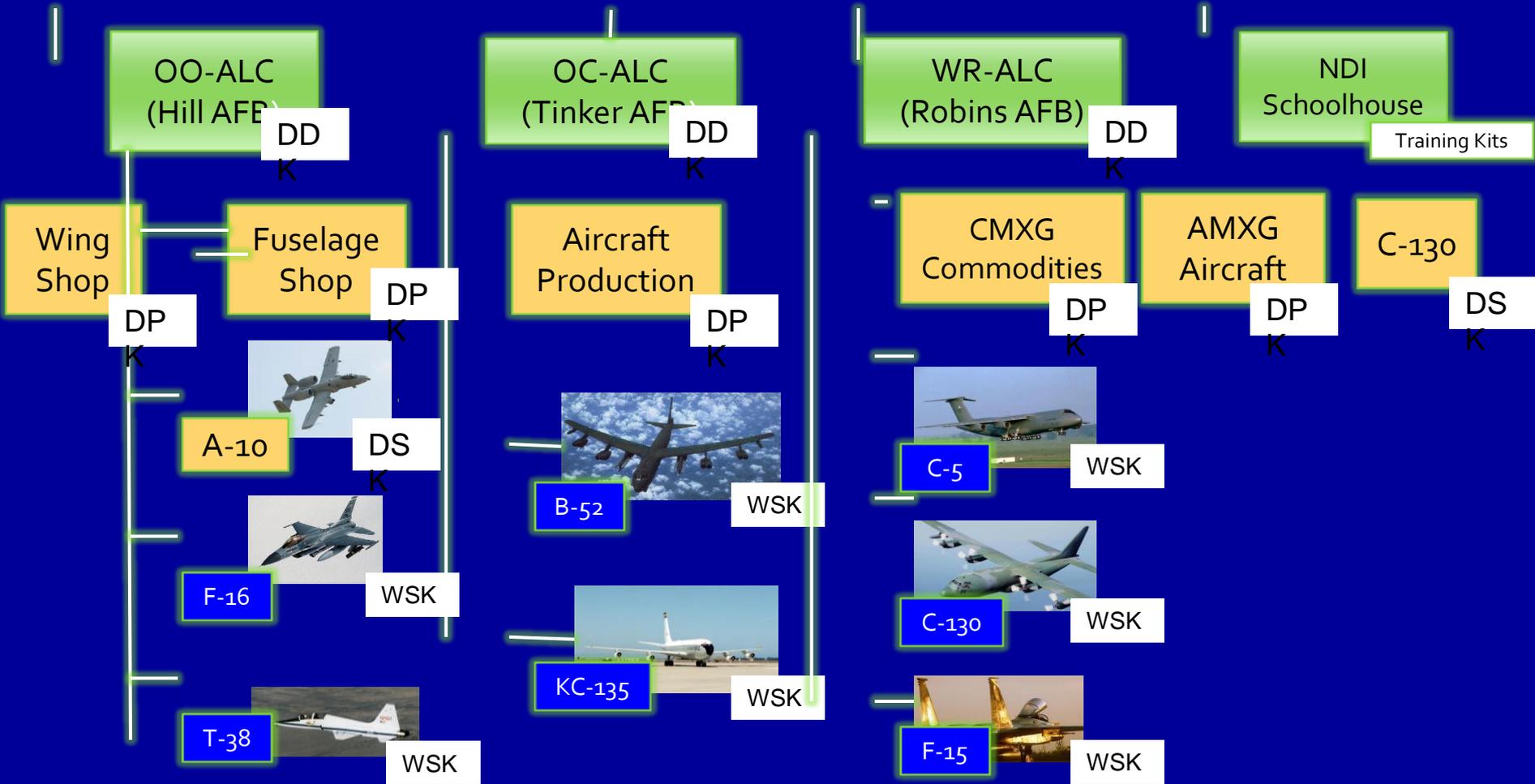


DDK Case # 1: Raised Head Fastener Kit (Smaller Diameter) - P/N99929

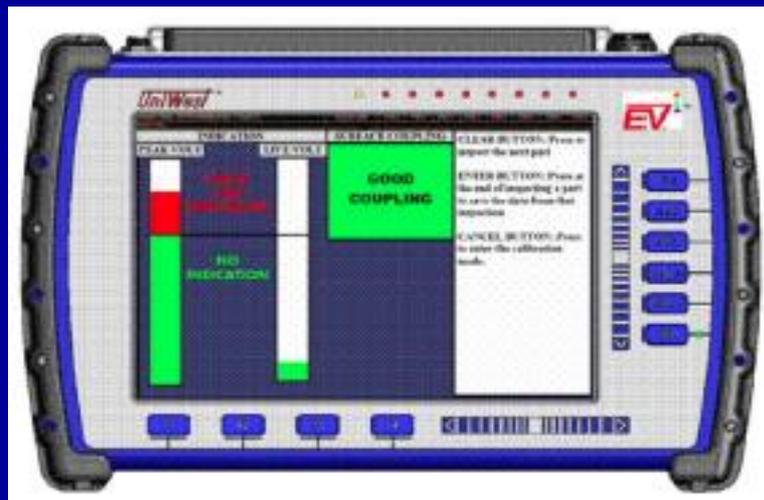
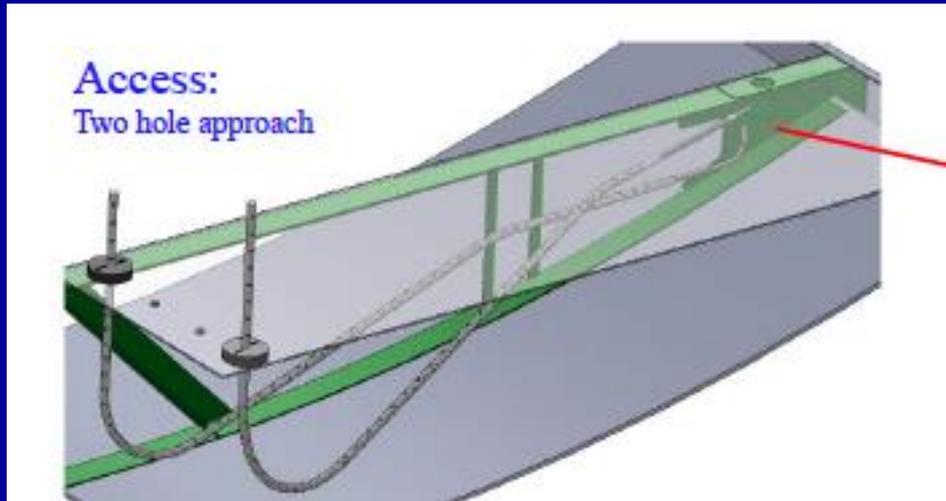
VENDOR P/N	ITEM	PER KIT QTY
URR-.210	Probe, Raised Head Fastener	1
URR-.240	Probe, Raised Head Fastener	1
URR-.270	Probe, Raised Head Fastener	1
URR-.300	Probe, Raised Head Fastener	1
URR-.330	Probe, Raised Head Fastener	1
URR-.360	Probe, Raised Head Fastener	1
URR-.390	Probe, Raised Head Fastener	1
URR-.420	Probe, Raised Head Fastener	1
URR-.450	Probe, Raised Head Fastener	1
URR-.480	Probe, Raised Head Fastener	1
URR-.510	Probe, Raised Head Fastener	1
URR-.540	Probe, Raised Head Fastener	1
71625	URR Wear face kit	1
77123	Manual URR cable	1
99929	Kit enclosure (Case)	1

USAF SOFI Phase III - Kit Deployment

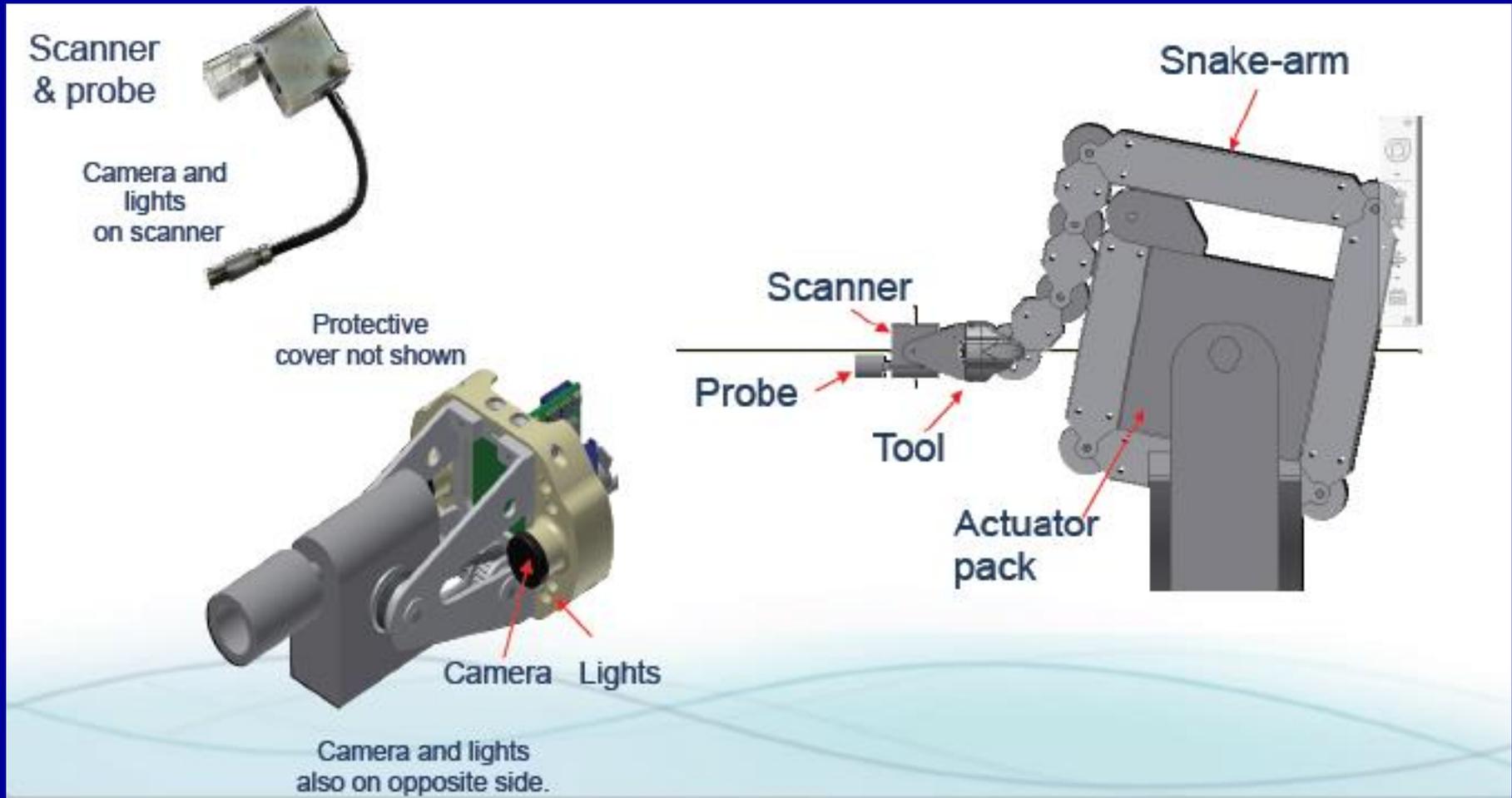
Uniwest (Probe Developmentt)



Videoscopes and Sensors



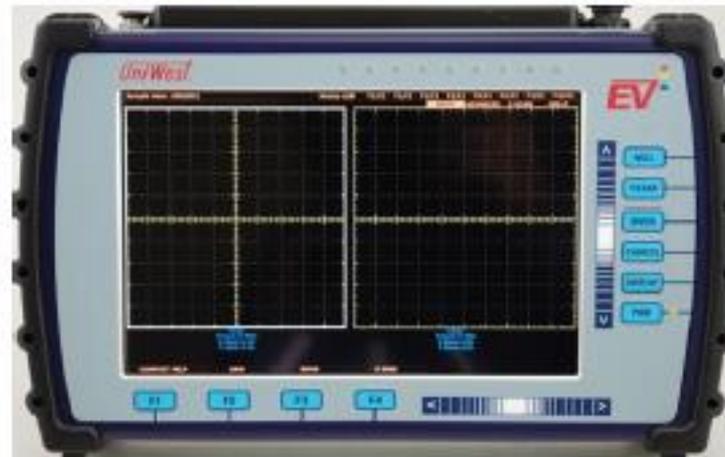
Robotic Arms and Sensors



Advanced New Products

Holy - grail: "Descriptive inspections versus Go - No Go"

Advanced Instrumentation (Evi)



Advanced BH Scanner



Advanced Surface Scanner

Descriptive Inspections Versus Go No-Go

Overhaul Inspection of Aircraft Engines

Sources of Inspection Problems

