



ENGINEER
NEXT

NIDays

The image features a background of diagonal stripes in various shades of blue, green, orange, and red. The text 'ENGINEER NEXT' is prominently displayed in white, with 'ENGINEER' in a smaller font above 'NEXT'. A yellow graphic element, resembling a stylized 'X' or a folded ribbon, is positioned between the two words. To the left of 'NEXT', the word 'NIDays' is enclosed in a white rectangular box, tilted to match the angle of the main text.



A software-centric platform that accelerates the development and increases the productivity of test, measurement, and control systems.

Agenda

- What is a “long life” system?
- How do I plan for “long life” systems using COTS products?
- How can NI help?

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Who has the oldest tester?

- My compare: NI's oldest tester (currently active):
 - Location: Hungary
 - Products tested: SCXI-1122/4 A/D Module
 - Station Software: DOS
 - Station Hardware: ISA plug-in boards
 - Architected by: NOT a formal Test Engineering team

SCXI-1124

6-Channel Isolated Digital-to-Analog Converter Module



[\[+\] Enlarge Picture](#)

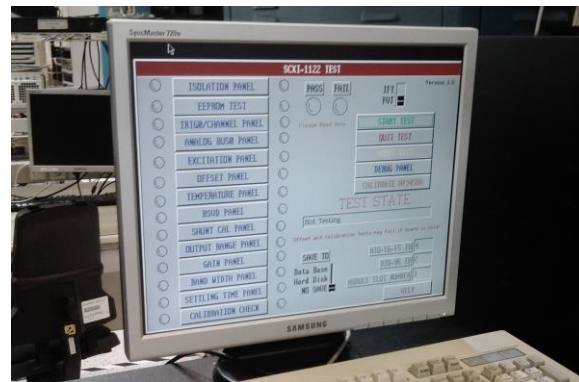
Starting at **\$ 2,313** ([view pricing options](#))

 [View Data Sheet](#)

- NI recommends the PXIe-4322.
- Software-programmable ranges
- 12-bit resolution
- Connect channels in series for output voltages up to ± 60 V per module
- 250 Vrms working isolation per channel
- NI-DAQmx measurement services software to simplify configuration and measurements

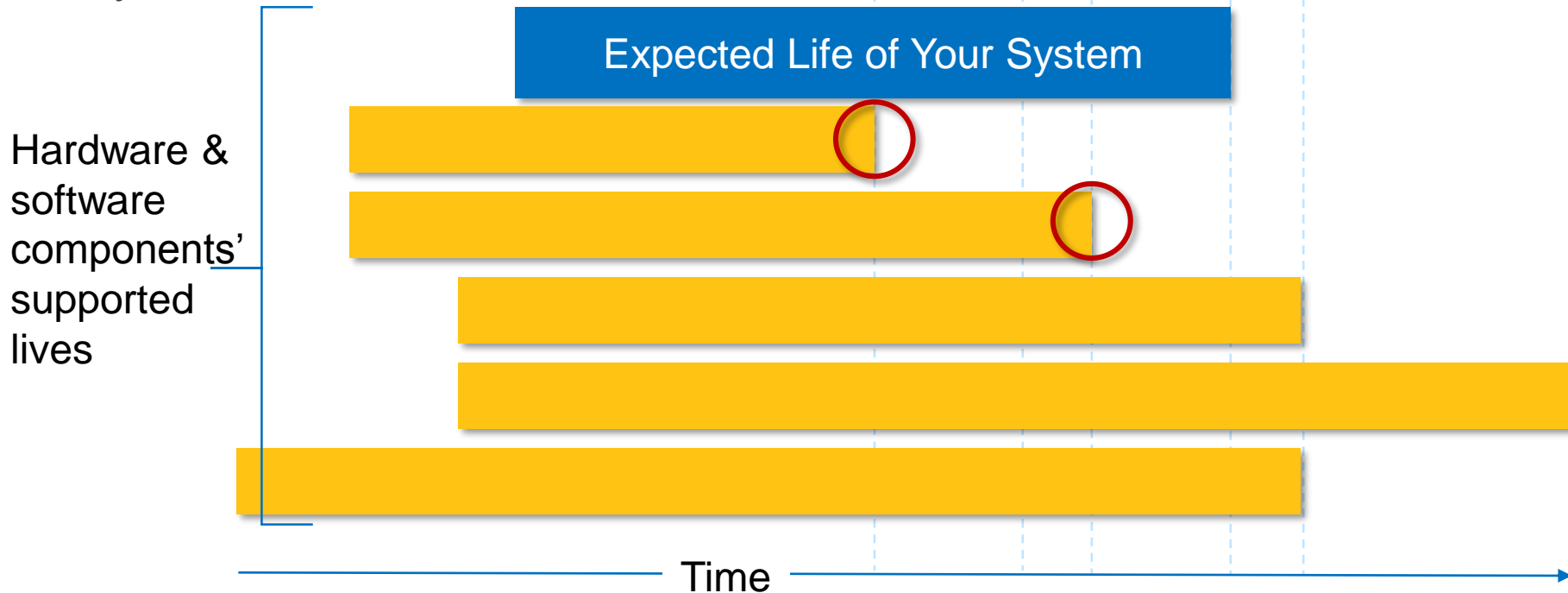
[Configure System](#)

[View Support Resources](#)



Do I have a "long life" system??

Maybe...

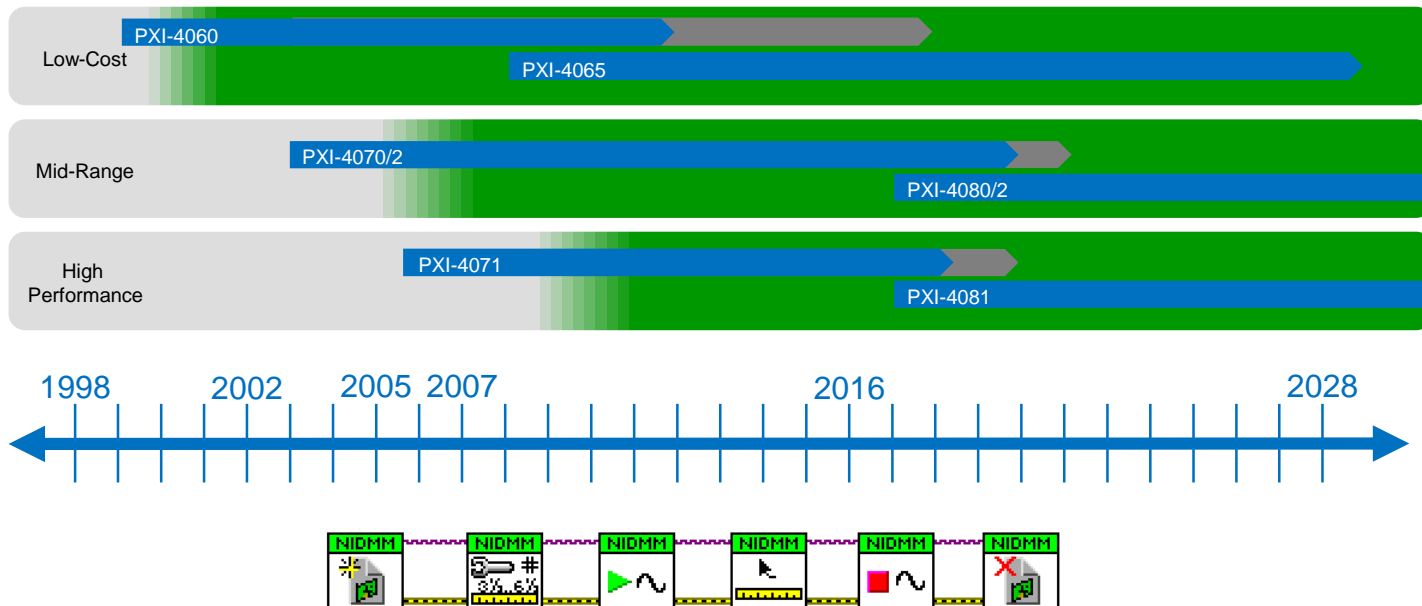


Long life system: Expected application life > Component's supported life

Typical PXI Platform Life Cycle Expectations

PXI Platform	NI's goal is to maintain the PXI platform as an industry standard for test and measurement for another 20 years or more Note: the platform now comprises both PXI and PXIe components.
PXI Instruments	Some instruments in the PXI platform (for example the PXI-4070 DMM) have been planned for a lifetime of around 10-15 years in market, although lifetime is module dependent. For core instrument capability (such as 6½-digit DMM measurements), NI's goal is to continuously provide equal or better core capability available for the duration of the platform's existence, so that customers have adequate time when migrating between specific models as needed. Note: newer instruments may become available only in PXIe
PXI Controllers	PXI controller life cycles are more directly affected by available PC technologies and thus are shorter and more predictable. As a result, NI PXI controllers have a typical lifetime of around 5 years. NI continuously invests to make the latest PC technologies available in the PXI platform.
PXI Chassis	Most NI PXI chassis have lifetimes of 15 years or more

30 Years of NI-DMM Support

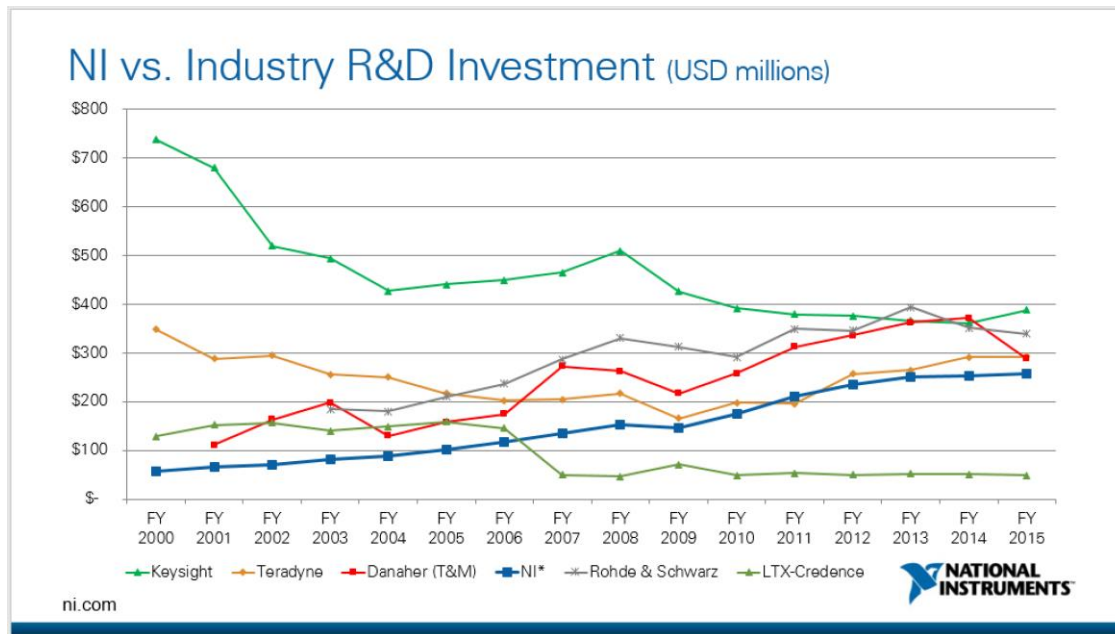


Changing Technologies and Market Forces

Technologies:

- Windows 10
- 64-bit
- Linux?
- Security
- Safety Certifications
- Programming Software
- RF Technologies

Industry Trends:



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If you think you have a long life system...

- Make a **conscious** decision to pursue a **reactive or proactive** approach to life cycle management based on the profile of your application
- Decide whether you will manage yourself or outsource that work
 - In reactive mode, you may be able to delay this decision
 - In proactive mode, this decision needs to be made up front
- Know what resources are available to help with your chosen approach

What is Life Cycle Management?

- Managing the series of changes a product (or test system) goes through, from its design and development to its retirement or disposal
- Typically broken into the following stages:
 - Beginning of life (BOL) - includes new product development and design processes
 - Middle of life (MOL) - includes collaboration with suppliers, product information management and warranty management
 - End of life (EOL) - includes strategies for how the products will be disposed of, discontinued or recycled

Source: <http://searchmanufacturingerp.techtarget.com/definition/product-lifecycle-management-PLM>

Should I Choose Reactive or Proactive?

1. You send in hardware for repair and they ask if you are willing to accept replacement with a newer model.
 - A. Yes!
 - B. No - Don't change anything!!!

2. You receive an email stating that the last-time-buy date for one of your system's hardware devices is coming up. There is a newer model available with better specs, but it requires a driver version upgrade.
 - A. OK we can easily handle this.
 - B. This is going to cost a significant of money and/or no recourse are available and/or certifications of the system prohibit changes

Should I Choose Reactive or Proactive?

Proactive Approaches

- Lower risk
- Higher up-front cost/effort unless outsourced
- Recommended for systems where hardware obsolescence highly impacts costs
- Especially recommended for those where probability of obsolescence is high

Reactive Approaches

- Higher risk
- Lower up-front cost/effort
- May be high cost/effort when a life cycle event occurs
- Recommended for systems where hardware obsolescence minimally impacts costs

Your company's philosophy or market regulations may also dictate your approach

Life Cycle Management Practices



Proactive/Strategic

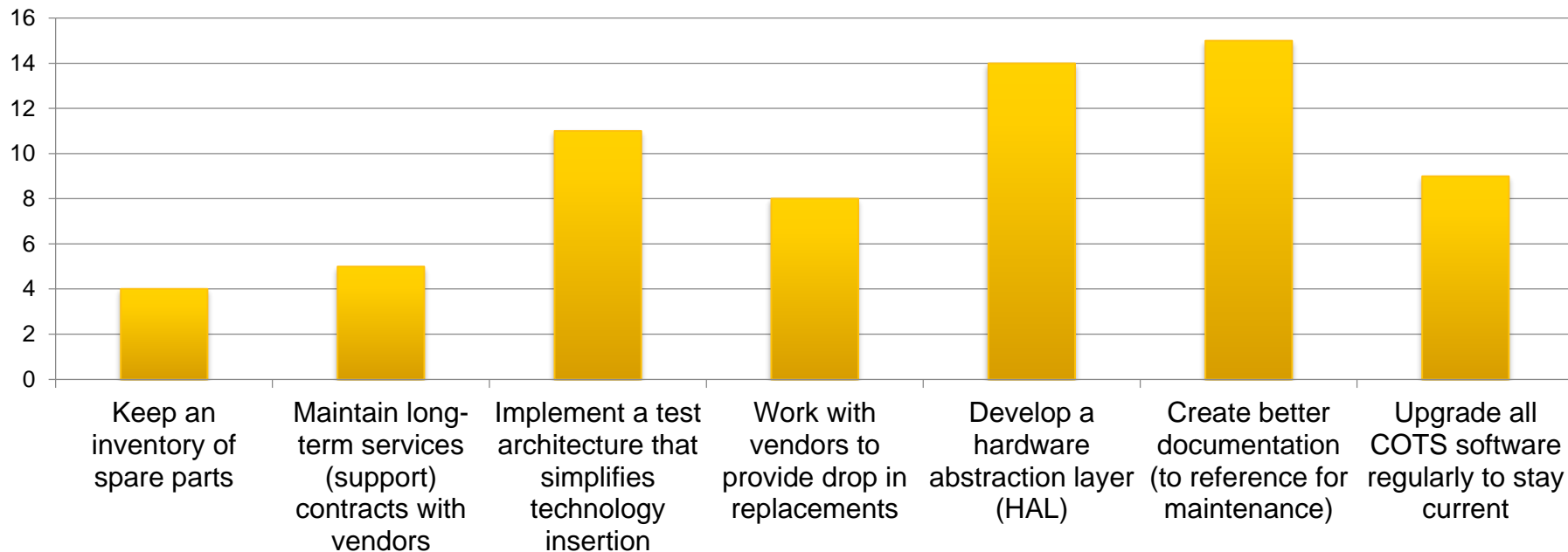
- Purchase Long Life Hardware
- Software Abstraction Layers
- Product Change Notifications
- Life Cycle Assessments
- Program Management Review
- Technology Refresh/Update
- Reserved Inventory
- Service Agreement
- Managed Spares

Reactive/Tactical

- Alternate source
- Substitution
- Redefine requirement
- Emulation
- Lifetime Buy
- Redesign
- Reverse Engineer
- Reclamation

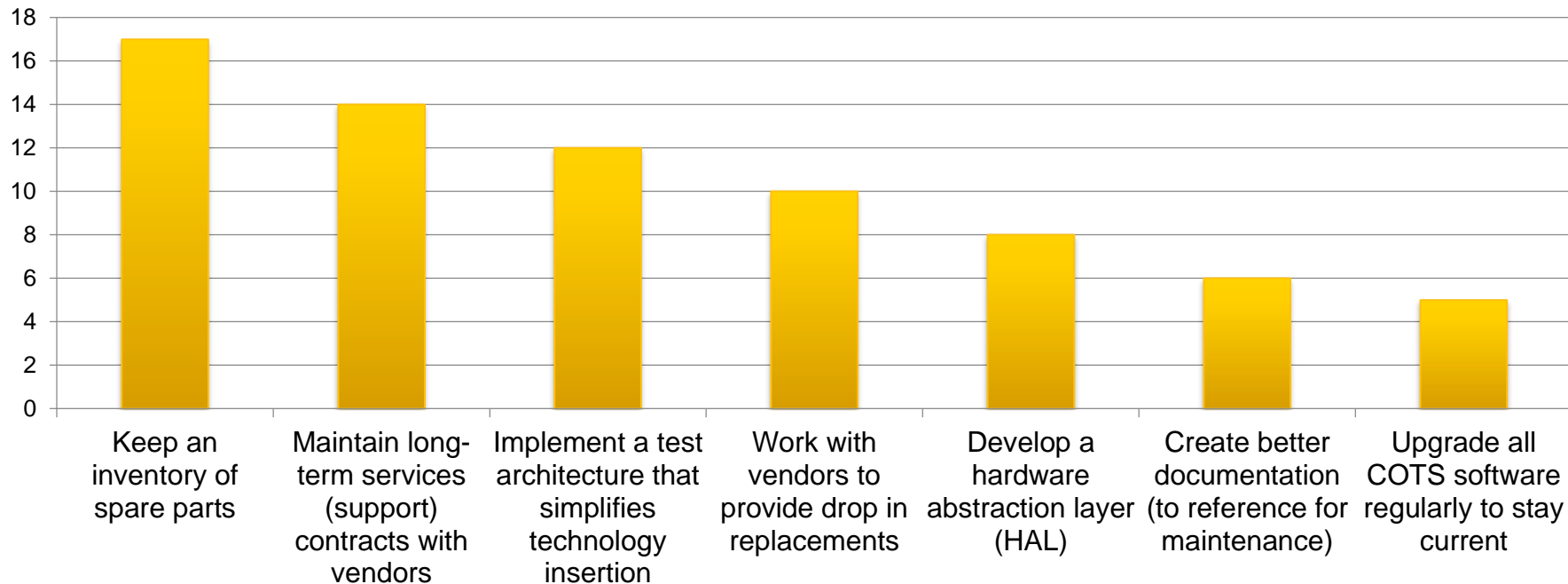
Which actions do you take to prolong the life of your test system and minimize obsolescence issues?

Considering in the next 2 years



Which actions do you take to prolong the life of your test system and minimize obsolescence issues?

Actions Already Taken



Globally Deploying a Standardized Test Platform



<u>NI PXI-1045</u>	18-slot 3U PXI chassis
<u>NI PXI-8108</u>	2.53 GHz dual-core PXI embedded controller
<u>NI PXI-2532</u>	512-crosspoint matrix switch module
<u>NI PXI-2568</u>	Medium-power general-purpose SPST relays
<u>NI PXI-4072</u>	Digital multimeter
<u>NI PXI-6221</u>	16-Bit, 250 kS/s, 16 analog inputs
<u>NI PXI-7852R</u>	Multifunction RIO with Virtex-5 LX50 FPGA
<u>NI PXI-5122</u>	14-bit 100 MS/s digitizer (used with two TEGAM 4040A amplifier/attenuator modules)

Results

18 obsolete test set replacements

22% increase in MTTR

23% decrease in LRU repair time

28% decrease in not repairable this station

80% decrease in Quality Deficiency Reports

Maintenance Challenges in USAF Depots

- ATE Challenges in USAF Depots.
 1. Government depots support aging aircraft still flying missions today.
 - The B-52 was first placed into active service in 1955 (62 years ago)
 2. With limited depot maintenance funding, Government test equipment is typically required to support the weapon system end-items (LRUs and SRUs) a minimum of 10-15 years.
 3. COTS instruments typically change every 3-5 years.
- Being pro-active to these challenges, CACI teamed with NI to implement a maintenance plan that would ensure tester availability for 15 years.

NI Maintenance Agreement

- To support our government customer's needs for long term Automatic Test Equipment (ATE) sustainability, CACI partnered with NI to provide an unheard of long-term COTS maintenance agreement that provided maintenance coverage for all of the National Instruments products contained within the ATE for a period of 15 years.
- This sustainment activity includes maintenance and repair of covered assets as well as a dedicated spares pool to ensure product availability for the life of the maintenance agreement.
- In addition, NI conducts annual PMRs with CACI and the customer to provide current maintenance analysis as well as forward looking analysis on potential EOL components or instruments.

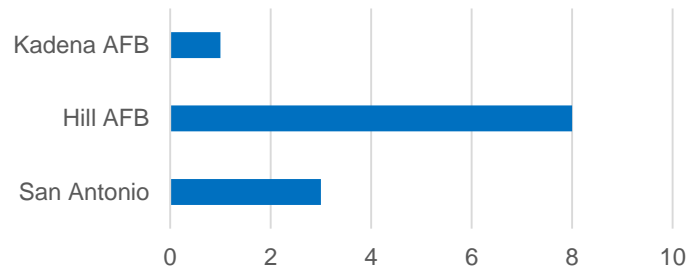
CBATS Module Returns by Location/Tester

2/3 of returns from Hill AFB

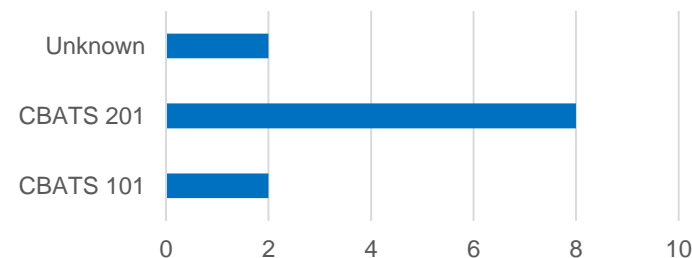
139 CBATS Model 101 and 201
Testers covered under
agreement

CBATS 201 instruments
account for 2/3 of returns

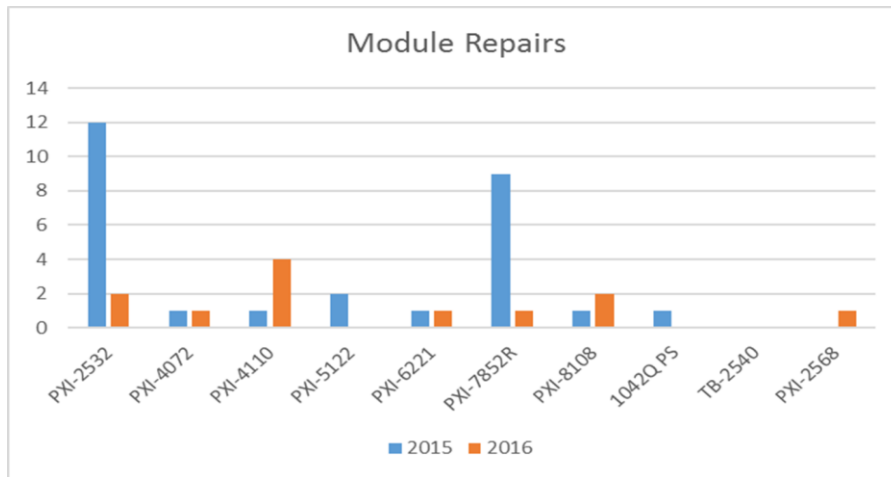
Repairs by Site



Repairs by Tester



Maintenance Reporting



- PXI-2532 repairs reduced from 12 repairs (11 shorted Relays) to 2 (1 shorted relay, 1 no data).
- PXI-4110 accounts for 4 repairs (3 fuses -over current/voltage, 1 no data).
- PXI-7852R repairs reduced from 9 repairs (1 fuse, 8 NTF) to 1 bad amp.
- PXI-8108 repaired 2 broken USB ports.

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Resources Available from NI for Life Cycle Management



Designing for Sustainability

- ni.com content on developing hardware abstraction layers

Life Cycle Communications

- Status on ni.com (mature, maintenance, obsolete phases)
- Product change email notifications:
 - Major (register on ni.com)
 - Minor (contract required)
- Customized life cycle report (contact sales, NDA required)

Life Cycle Consulting Service

- Consulting with NI Alliance Partner or NI Application and Systems Engineers
- Recommended actions

Long Life Service Program

- Guaranteed long-term product availability up to 20 years under service contract
- Annual updates and life cycle status information

Key takeaways for your long life system...

- Make a **conscious** decision to pursue a **reactive or proactive** approach to life cycle management based on the profile of your application
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- NI offers numerous resources to help with your chosen approach



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