

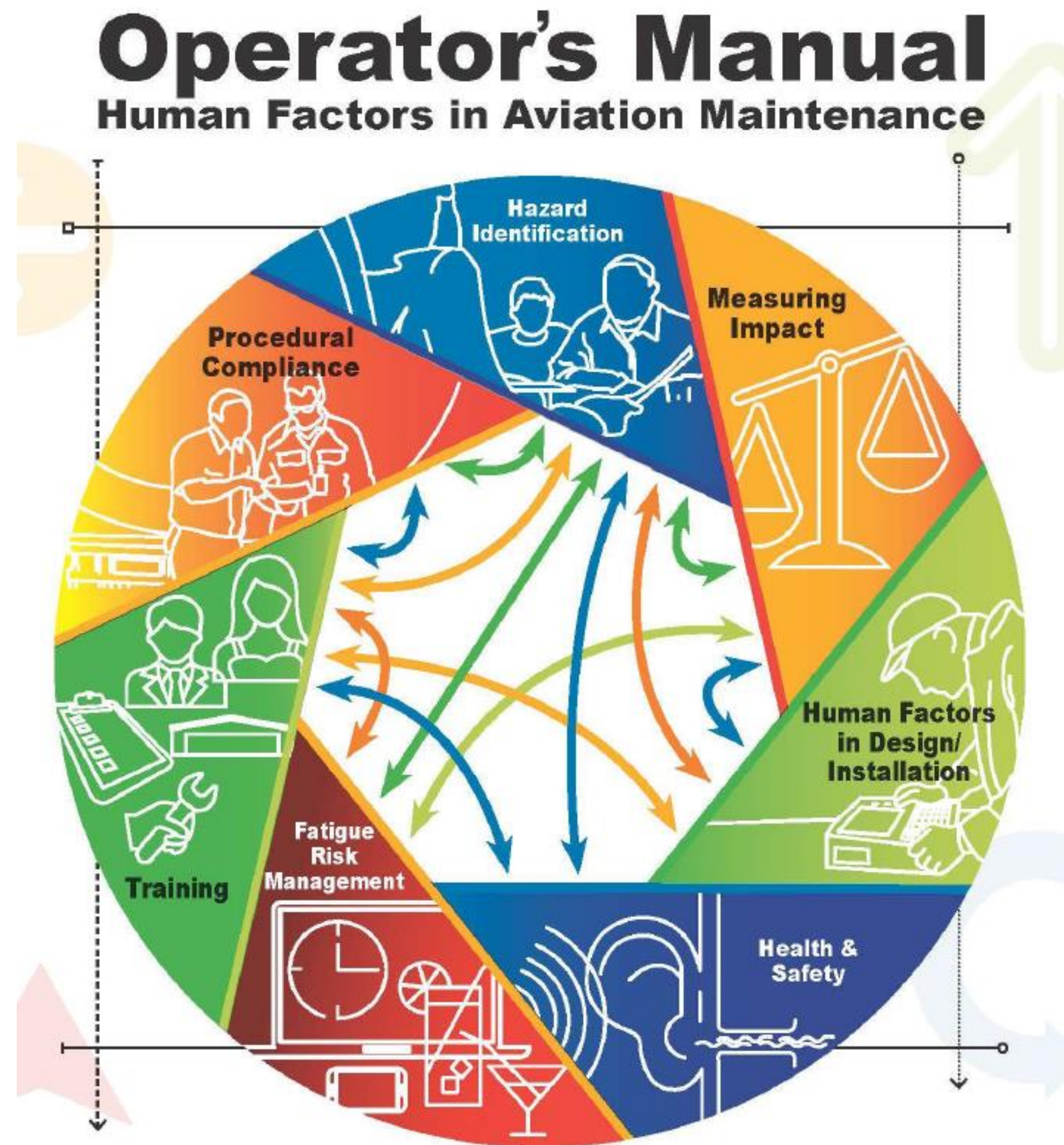
How to Use Maintenance ROI as a Tool to Boost Profits

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The logo for Management & Excellence is displayed within a black rectangular frame. It features the words "MANAGEMENT" and "EXCELLENCE" in a serif font, separated by a vertical line. The letters "M" and "E" are positioned on either side of this line, creating a central emblem.

MANAGEMENT & EXCELLENCE

Measuring MT impact is part of the mix



Why maintenance training ROI is high

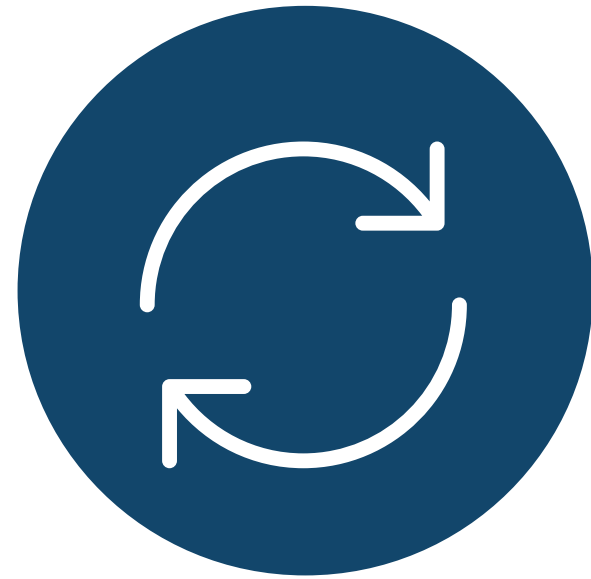
- > MT is cheap (costing \$50 an hour*) while airplanes are expensive (e.g. \$2,550/block hr for 757-200**)
- > Even small impacts on reliability due to training easily generate high ROI

* Pratt & Whitney CTC, Line & Base course for NB, 2018

** ICAO, 2017



ROI of a line & base training for A320 engines



Operating Efficiency

Total L&B Course Cost:
\$6,700 (incl. \$3,200 tuition)
6 Hours Reduced
Downtime: \$22,200
= Simple ROI +231%



Events

Total L&B Course Cost:
\$6,700 (incl. \$3,200 tuition)
One D&C Prevented:
\$18,500
= Simple ROI +176%

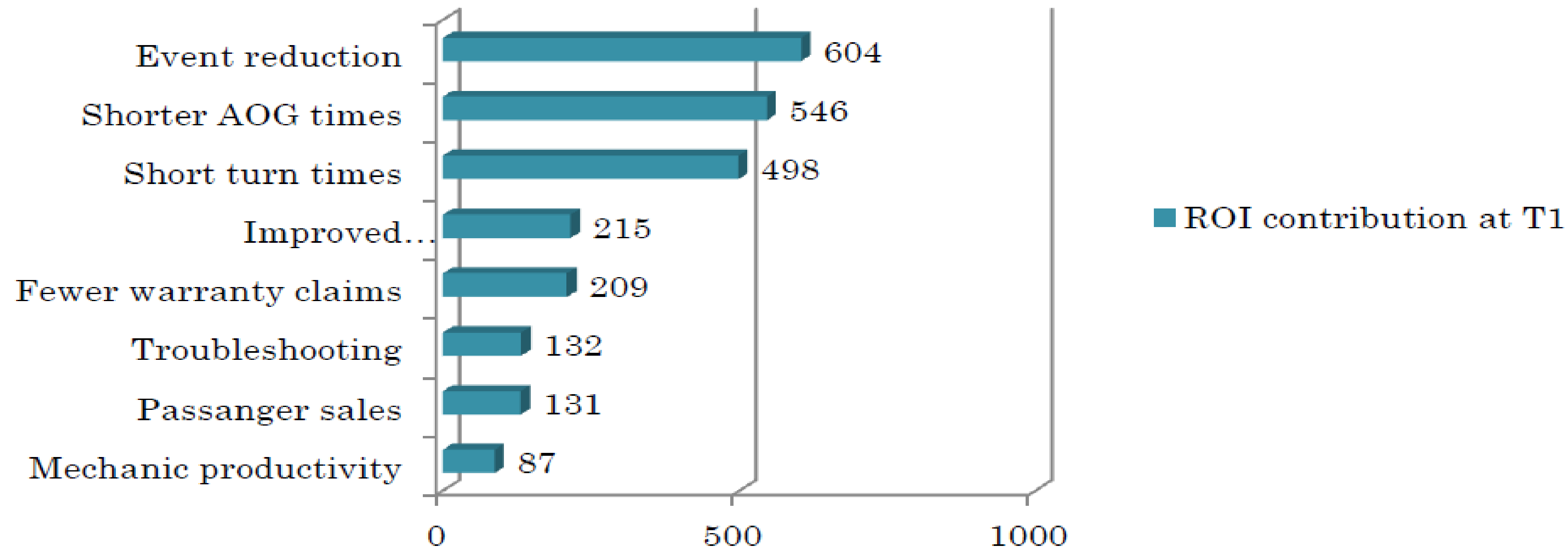


Unscheduled Engine Removals

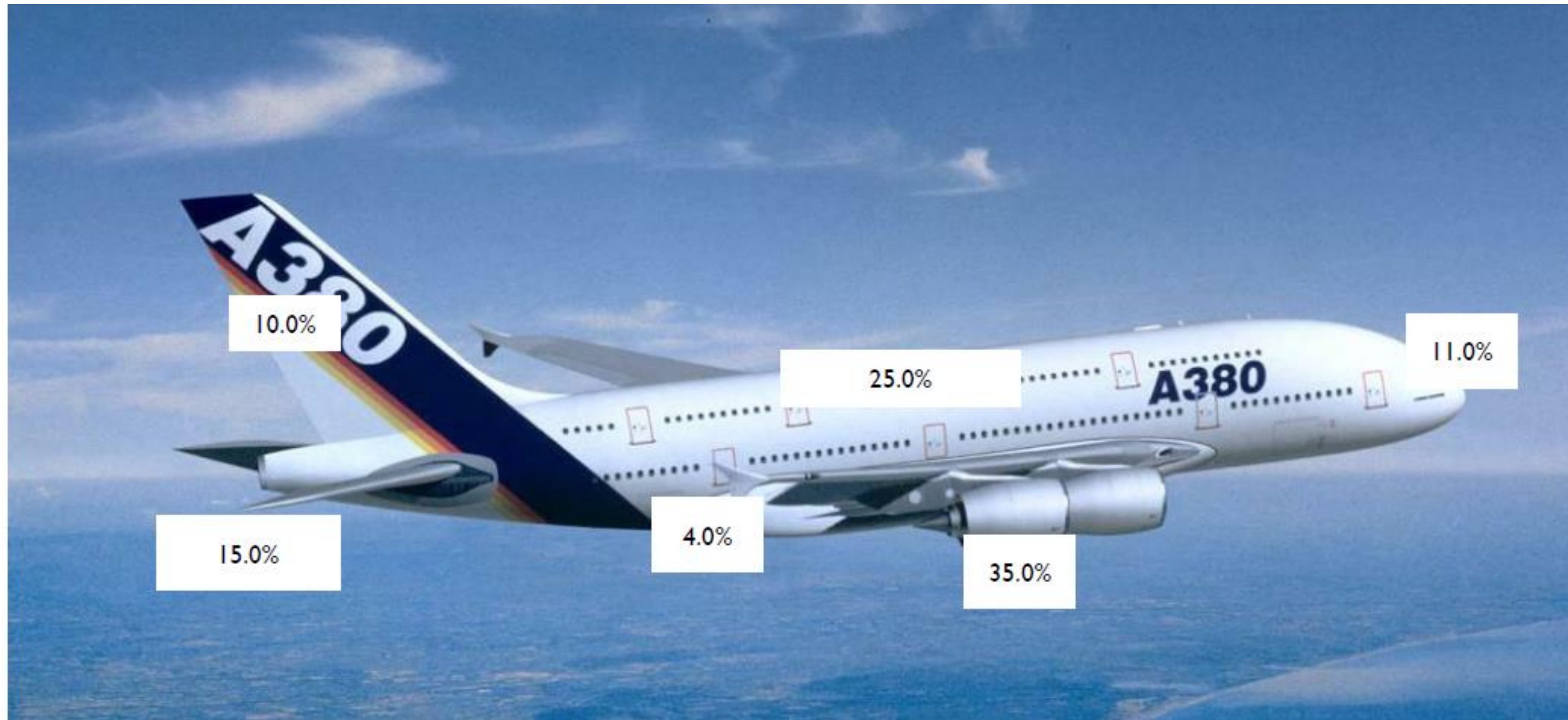
Total L&B Course Cost:
\$6,700 (incl. \$3,200 tuition)
One UER Prevented:
\$1,068,000
= Simple ROI +15,840%

** Within 1 year of L&B training for NB:adjusted by M&E Training Effectiveness Indicator*

Sources of maintenance training ROI



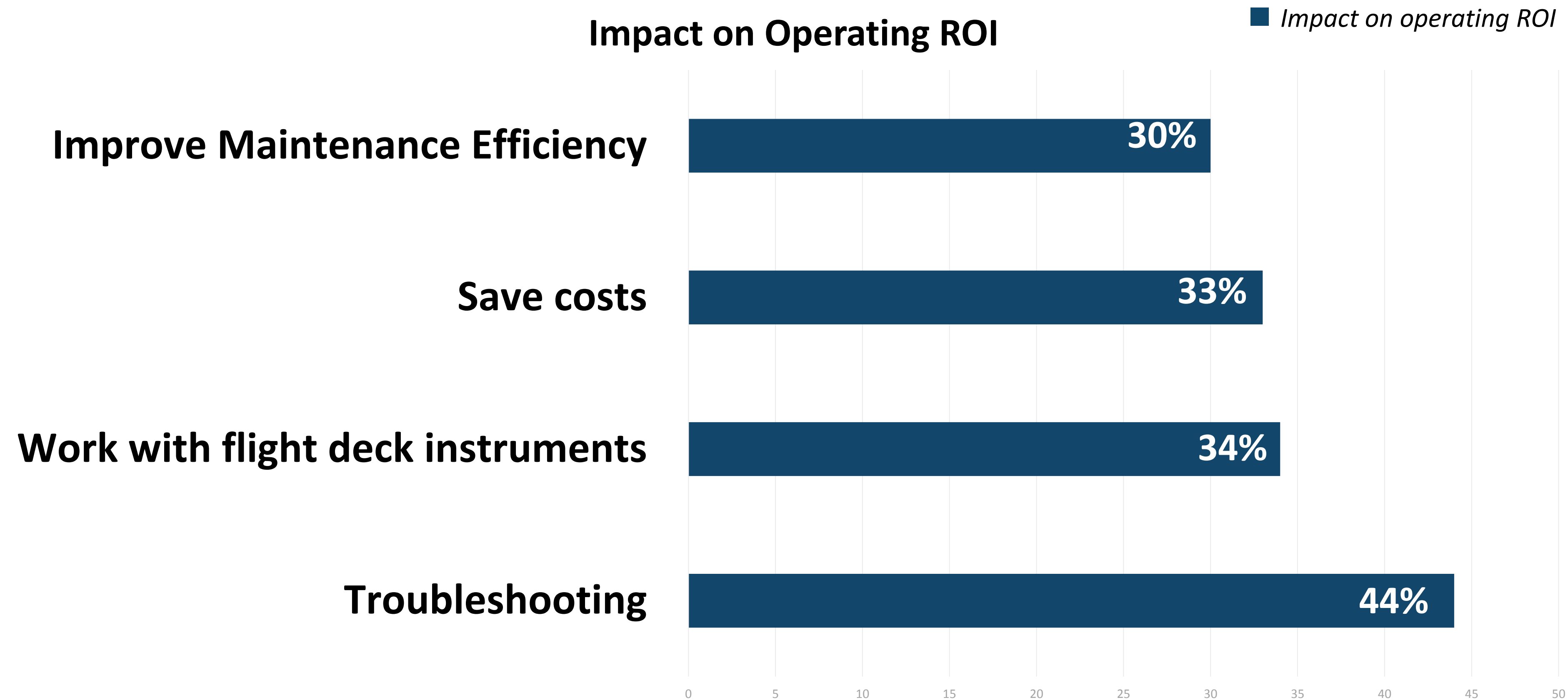
Maintenance training ROI by frame area



Types of training costs

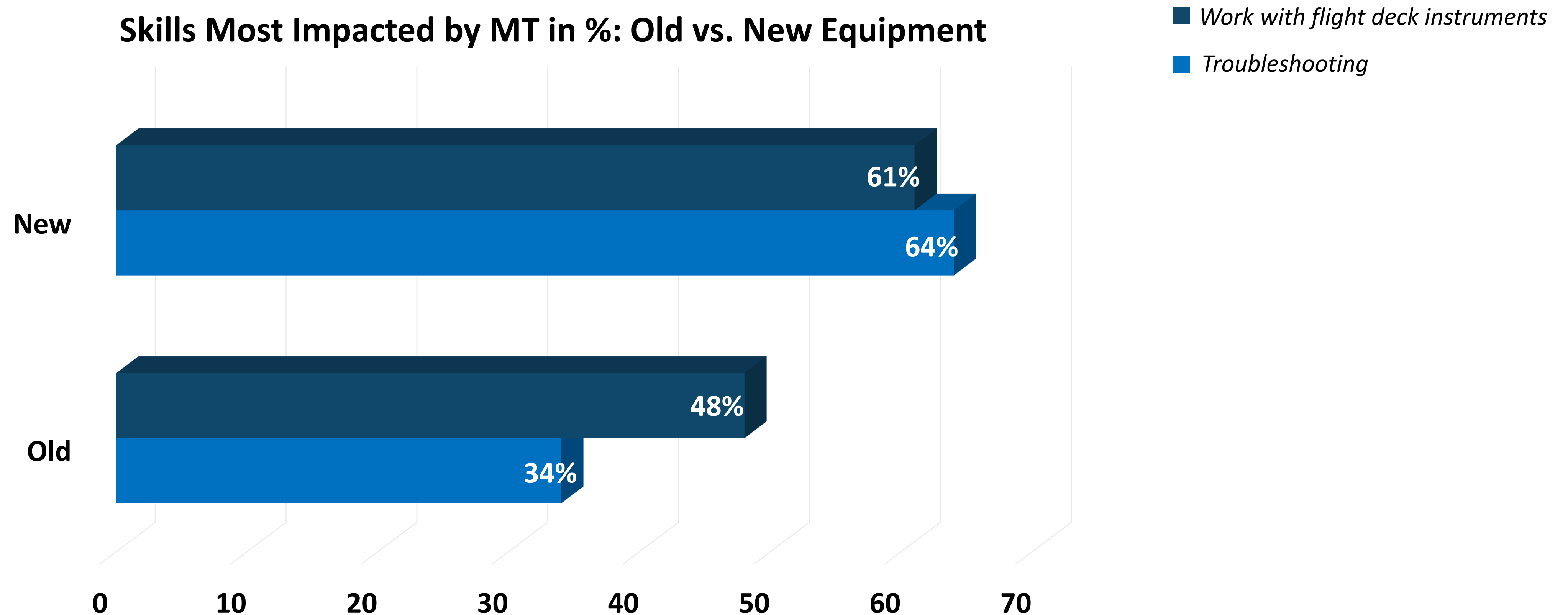
Training Cost Type	Type of Cost	Typical % of Total Training Cost
Impact on Fleet Reliability, AOG Times	--	70% - 80%
Course Fee	Direct	10-15%
Travel Oups	Direct	5-10%
Internal Processes of Team	Indirect	5%

Skills most impacted by MT



Source: Management & Excellence consolidated client data

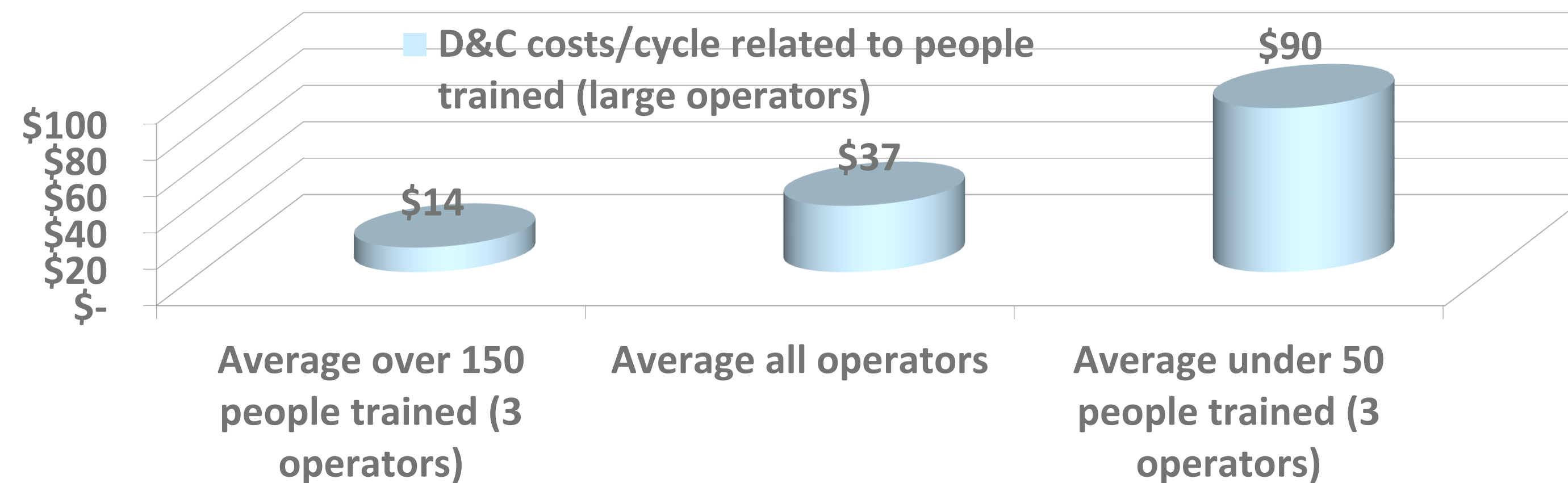
Impact of MT on New vs. Old Equipment



Source: Pratt & Whitney Customer Training Center and Management & Excellence, 2017

Training More Mechanics = Fewer Events

Ops Disruptions/Cycle related to people trained (large operators)



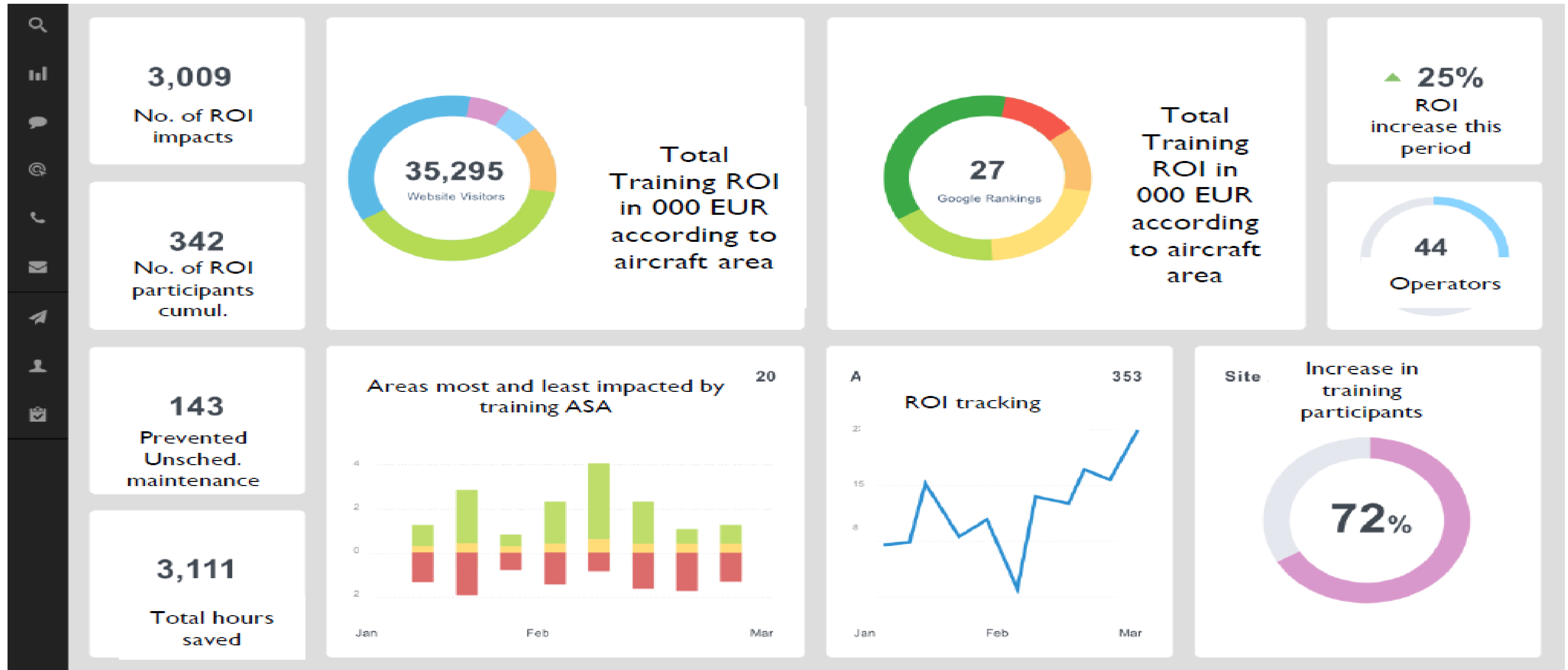
Source: Pratt & Whitney Customer Training Center and Management & Excellence, 10 airlines 2008-2017

How measuring MT ROI works

 SMART ROI™
on Human Capital



How measuring MT ROI works



ROI of MT ROI for OEM's

Impact for OEM	Return types (<i>hypothetical values intended to illustrate returns only</i>)	Costs considered (<i>proportionate costs plus M&E project costs</i>)	M&E benchmarks of how much similar client projects contributed to return types	ROI for OEM is for SMART ROI Pilot Project in US \$ (<i>hypothetical values</i>)
New aircraft sales 1-2 yrs	Revenues from new aircraft sales \$100,000,000	Sales oops, personnel costs, portion of FSR, CS \$ 500,000	2% to 15%	\$1,500,000 to \$14,500,000 ROI
Aftermarket maintenance services 1 yr	Added revenue from maintenance services \$ 10,000,000	Sales oops, personnel costs, portion of FSR, CS \$ 200,000	10% to 25%	\$ 800,000 to \$ 2,300,000 ROI
Added training 1 yr	Added training revenues \$ 500,000	Training costs, room, oops, personnel \$ 50,000	20% to 35%	\$ 50,000 to \$ 125,000
Reduced warranty costs for OEM 1 yr	Reduced warranty costs/aircraft/time period/customer over benchmark \$ 5 mio	--	2% to 8%	\$ 100,000 to \$ 400,000
Reduced time to sales; sales costs 1-2 yrs	Higher revenues within shorter times	Actual/average sales time, costs & efforts	Included under new aircraft sales and aftermarket sales	---
Optimizing training curriculum 6 months	More effective training: customers likely to engage in more training with OEM	--	Included iunder added training revenues	---

Measuring MT ROI can help recruitment

- > ATEC: 27% of FAA certified engineers are 64 yrs or older
- > 500,000-600,000+ engineers needed by 2036 (Airbus, Boeing)
- > MT ROI gives them credit, esteem, image & paves way for justifying higher salaries



MT: Issues to decide

- > Which personnel to train when
- > In which areas
- > Curriculum, skills needed
- > Whom to train with: OEM, in-house, or contractor?
- > Maintenance personnel recruitment
- > Maintenance allocation plan & budget
- > = Optimized maintenance training ROI

Thank you & questions



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