



The Power of “Little Data” and the Evolution of MRO



Maintenance Cost Conference

September 13-15, 2017: Panama City, Panama

TODAY'S AGENDA



- 1 Evolution of MRO**
- 2 Then vs. Now**
- 3 Summary & Conclusion**

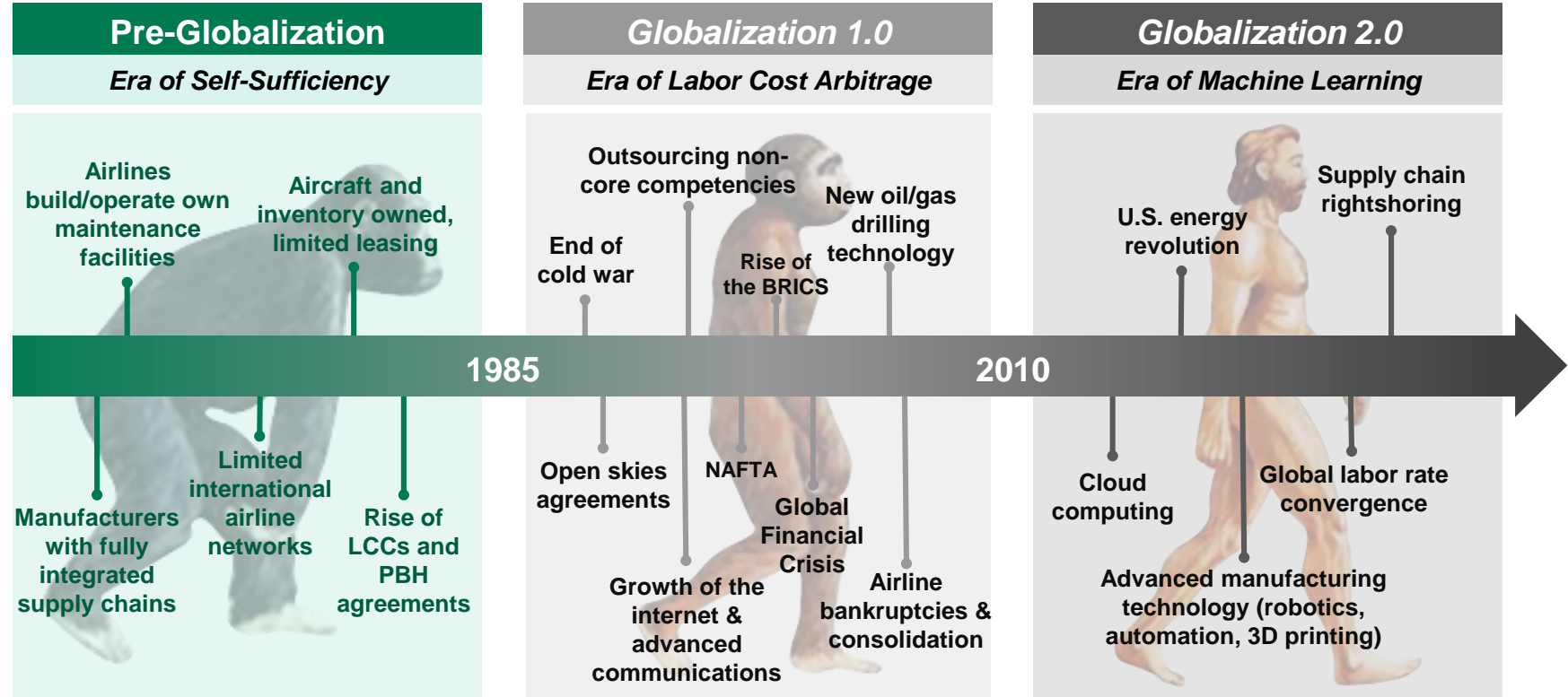
lit·tle da·ta

Noun: Little Data

Definition: Life before “Big Data”...

**Traditional, old school engineering design,
planning, entrepreneurship, communication,
and leadership**

The MRO industry and aerospace supply chain continue to evolve, driven by technological, commercial, and geopolitical events



Then

10,000

Now

25,000

150%↑

Over the past 20 years, the global fleet size has grown by a CAGR of 4.7%

Then
24%

Now
17%

29%↓

Twenty years ago, one quarter of the global fleet consisted of widebody aircraft; today, growth trends favor smaller aircraft

Then
168

Now
363

116%↑

**Over the past 10 years, the average daily departures in Panama City (PTY)
has more than doubled**

Then
1,700

Now
258

84%↓

There were 1,400 fewer commercial aviation related deaths last year as compared to 40 years ago

Then

\$799

Now

\$621

22%↓

Compared to 20 years ago, the average cost to fly from New York to London has decreased by 22%

Then
6%

Now
23%

283%↑

The low cost carrier business model was an industry paradigm shift

OEM Production Rates

Then

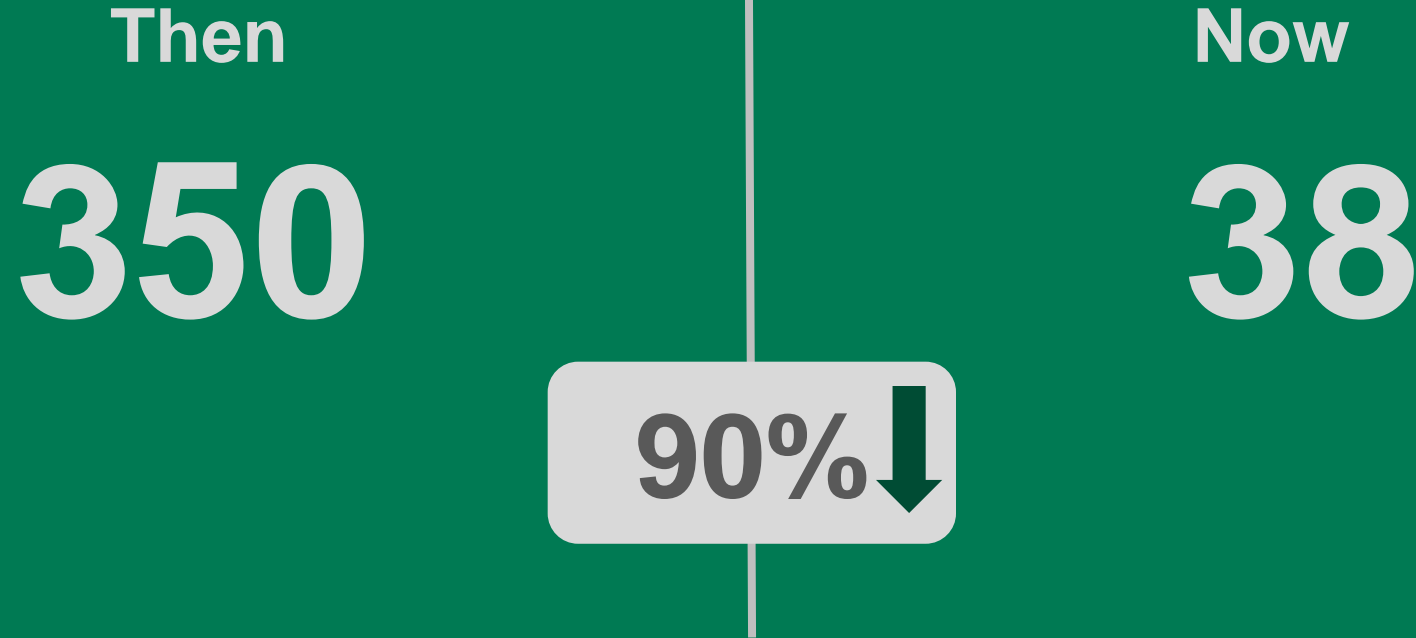
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Now

50

900%↑

Airbus is now producing A320s at an extraordinary rate of 50 per month



Embraer consolidated its supply chain by approximately 90% to produce the E-Jet as compared to its previous generation ERJ regional jet



There are over 1.3 million more FAA approved PMA parts on the market today as compared to 25 years ago



Then
6,000

Now
25,000

316%↑

Current generation narrowbody jet engine time between overhaul (in flight hours) has almost tripled

Then

2.25

Now

0.64

72%↓

Current generation narrowbody airframe maintenance man-hours (per flight hour) for a full C-check cycle is significantly lower

Then

380,000

Now

314,000

18%↓

There are over 65K fewer A&P licensed technicians than two decades ago

Maintenance Cost per ASM (CASM)

Then

0.020

Now

0.008

60%↓

Over the past 25 years, operator's unit maintenance costs have significantly dropped

Technical Dispatch Rate (TDR)

Then

99.2%

Now

99.8%

0.6%↑

**Operators of previous generation aircraft struggled to achieve 99% TDR;
today, most airlines are achieving 99.8%**

Then

8

Now

5,200

Since the first installation in 2004, more than 5,000 aircraft have been equipped with in-flight Wi-Fi connectivity

Then
0.40

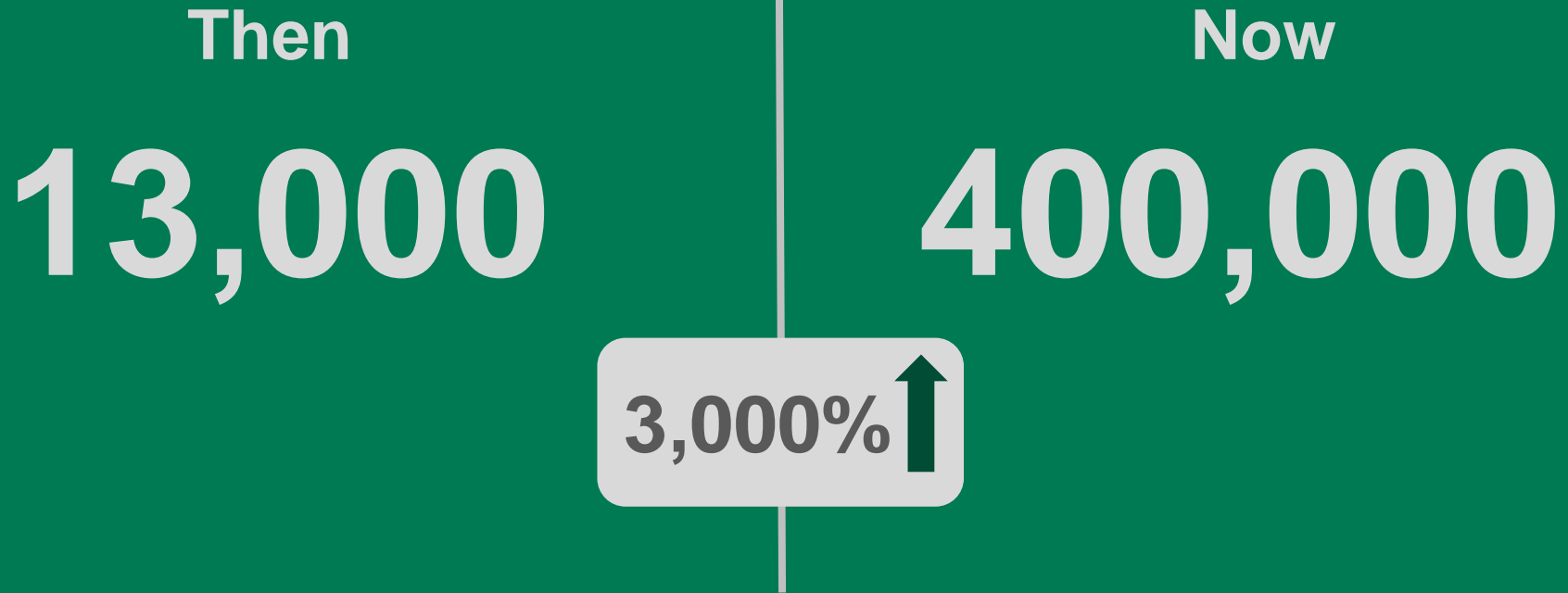
Now
70+

16,000%



Aircraft in-flight connectivity speeds are consistent with Moore's Law





The A350 monitors 375,000 more operational parameters than an A320

SUMMARY & CONCLUSION



1

“Little Data” has been, and will continue to be, the cornerstone of aviation & MRO innovation

2

“Big Data” analytics will inevitably drive further industry improvements; but fundamental challenges remain:

- Data ownership, standards, and integration
- With OEMs, airlines, MROs, and IT firms not only investing in competing data analytics technology, but also competing for access to the data itself, can any single entity’s data set become...“big”?
- When will the benefits outweigh investment costs?
- Who will benefit most (e.g. passengers, airlines, OEMs, IT firms, MRO suppliers)?

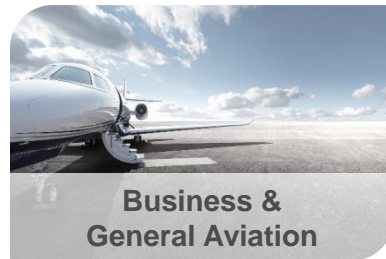
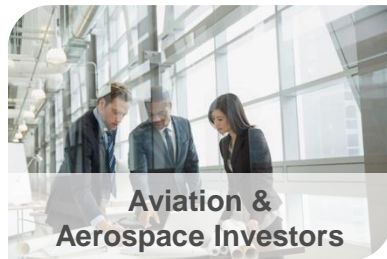
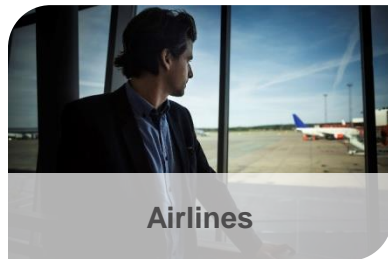


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