



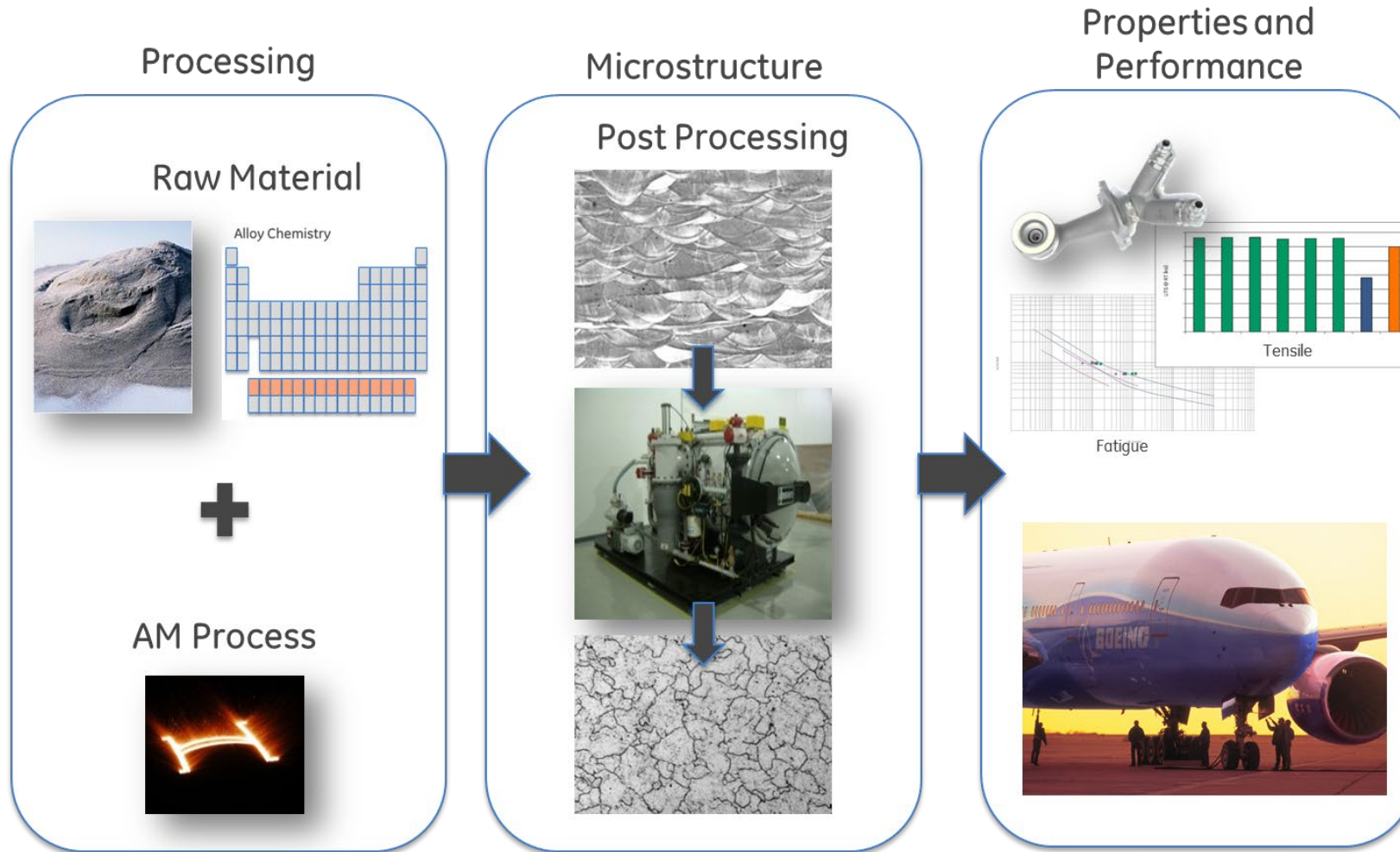
GE Aerospace

— NIST SME Workshop Panel 2 Discussion LSI Challenges

— Dave Abbott
Senior Staff Engineer
Additive Manufacturing
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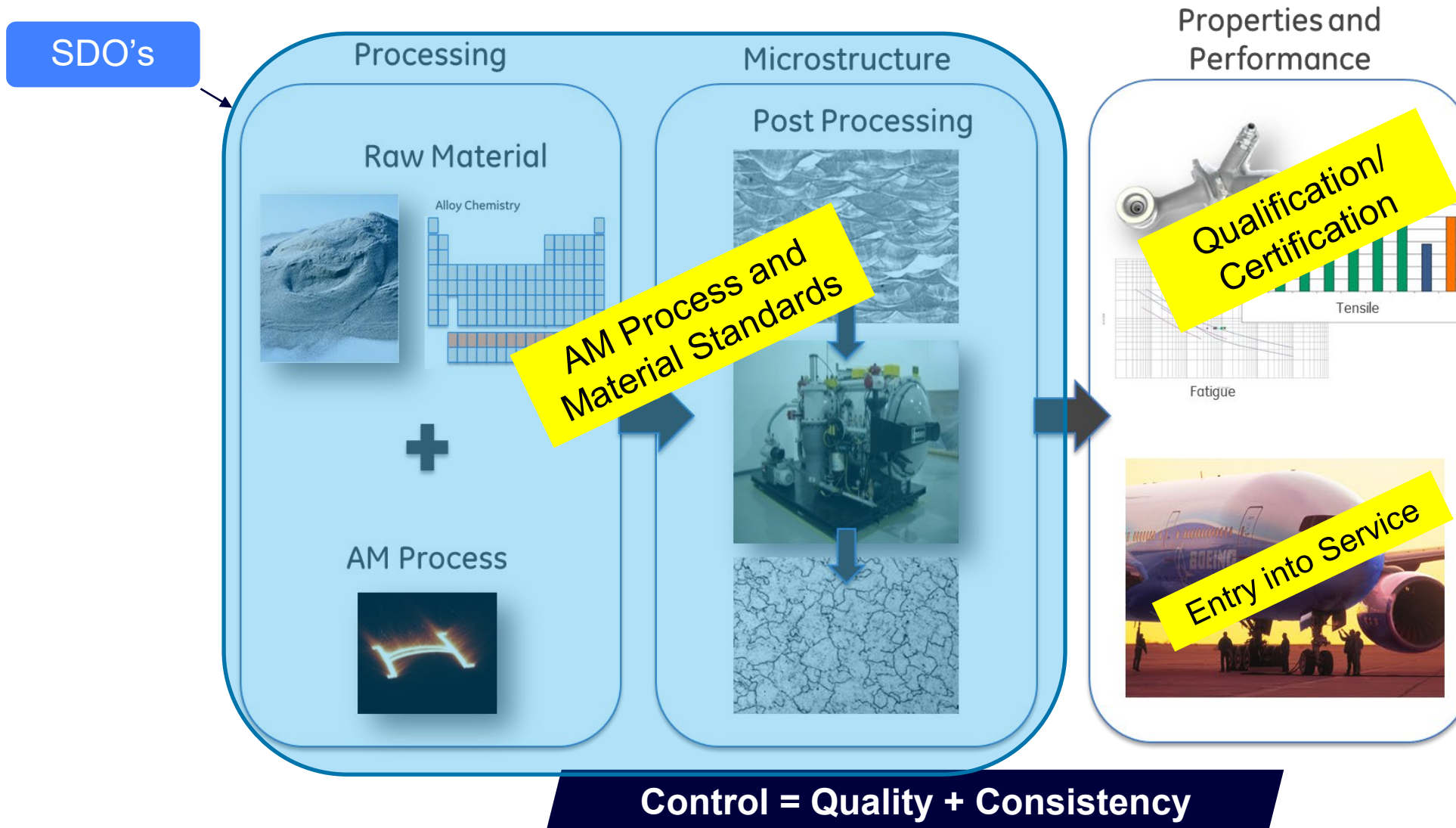
– AM Supplier Qualification

Additive Manufacturing Process Basics

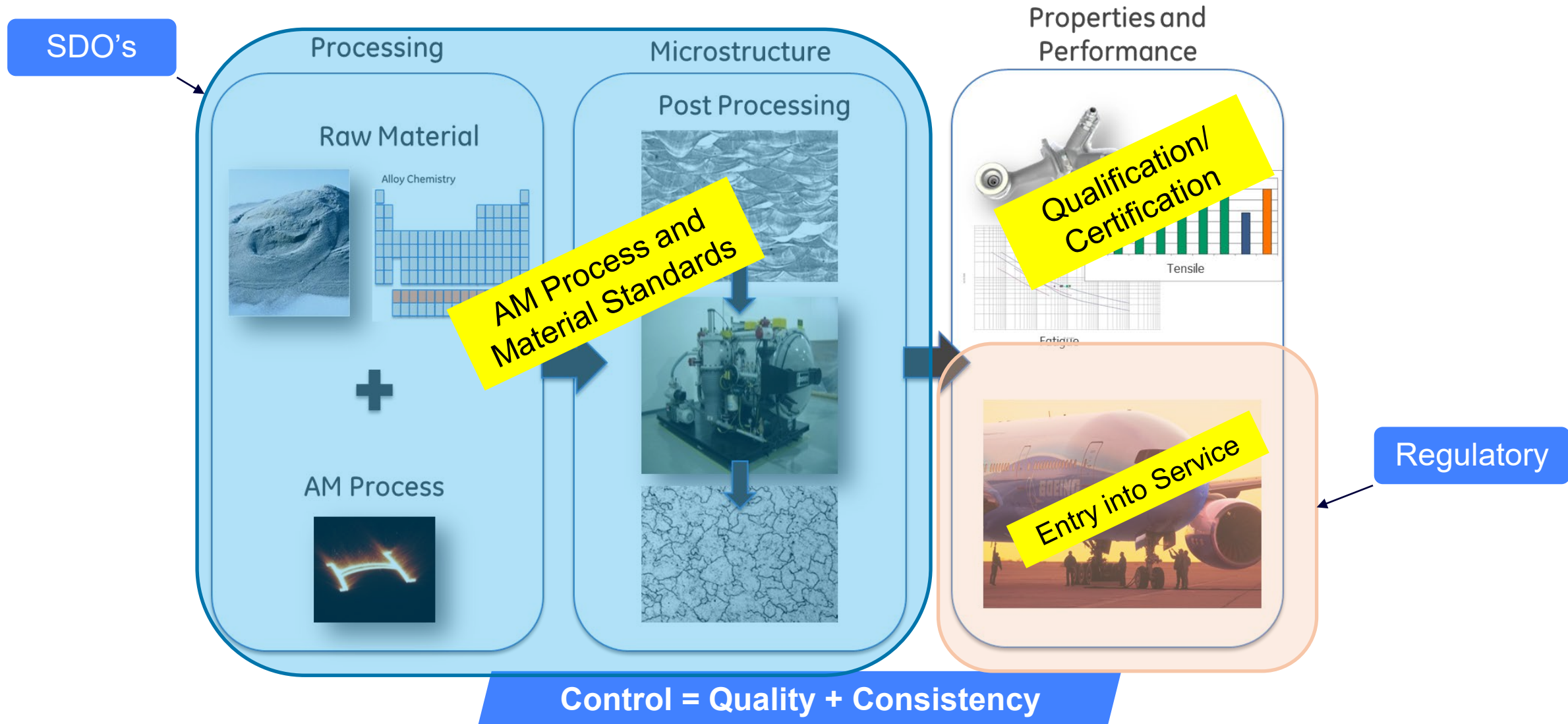


Control = Quality + Consistency

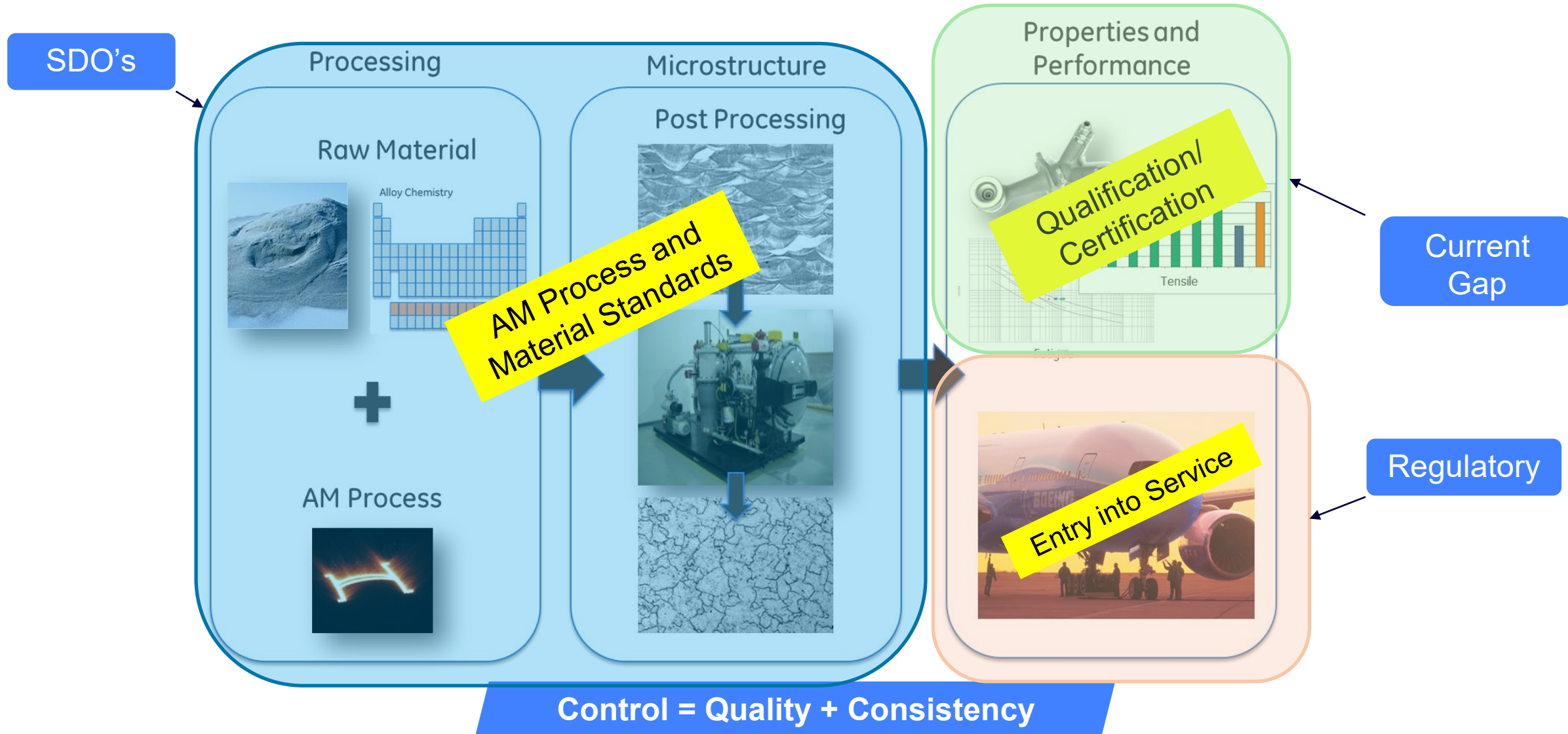
Additive Manufacturing Process Basics



Additive Manufacturing Process Basics



Additive Manufacturing Process Basics



AM Supply Chain Challenges Today

- Limited 'qualified' AM parts supplier base
- Limited understanding of 'qualification' requirements
 - Part, Material, Supplier, Equipment, Operator
 - IQ, OQ, PQ (materials and parts)
- Cost of developing and qualifying AM suppliers
- Supplier Oversight (auditing and certification)

Supply chain is developing.
Qualification and oversight need to develop with it.

AM Supplier Qualification Today

- AS9100
- Customer supplier qualification (general quality system requirements)
- Customer AM process site qualification (site audit by process)
- AM material qualification (by machine serial number and material spec)
- AM part qualification (by part serial number)
- Periodic special process audit (site accreditation renewal)

This is very OEM-specific, i.e., does not transfer.
Cost and effort are significant.

AM Supplier Qualification Today – Timeline and Cost

- AS9100 = up to supplier
- Customer supplier qualification = 12-18 months = \$
- Customer special process qualification = 6-12 months = \$
- AM material qualification = 12-18 months, \$\$
- AM part qualification = 6-12 months = \$\$\$
- Periodic special process audit = 3-6 months, every 1-3 yrs = \$

Up to several years to qualify a supplier and first part number.

AM Supplier Qualification – Future (for discussion)

- AM Ecosystem
- Qualification pre-work
 - AS9100 or similar accreditation
 - Nadcap or similar accreditation for AM special processes
 - AM baseline material pre-qualification (common database)
 - AM representative part pre-qualification (representative part geometry)
 - Periodic special process audit (Nadcap)
- Supplier completes prework to establish process and demonstrate capability, then approaches OEMs.
- Would still need OEM-specific qualification but at significantly reduced effort.

50-80% of qualification effort would not be OEM-specific and would be transferable.

– Thank You



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