

UTM Technical Capability Levels (TCLs)

CAPABILITY 1: DEMONSTRATED HOW TO ENABLE MULTIPLE OPERATIONS UNDER CONSTRAINTS

- Notification of area of operation
- Over unpopulated land or water
- Minimal general aviation traffic in area
- Contingencies handled by UAS pilot

Product: Overall con ops, architecture, and roles

CAPABILITY 3: FOCUSES ON HOW TO ENABLE MULTIPLE HETEROGENEOUS OPERATIONS

- Beyond visual line of sight/expanded
- Over moderately populated land
- Some interaction with manned aircraft
- Tracking, V2V, V2UTM and internet connected

Product: Requirements for heterogeneous operations

CAPABILITY 2: DEMONSTRATED HOW TO ENABLE EXPANDED MULTIPLE OPERATIONS

- Beyond visual line-of-sight
- Tracking and low density operations
- Sparsely populated areas
- Procedures and “rules-of-the road”
- Longer range applications

Product: Requirements for multiple BVLOS operations including off-nominal dynamic changes

CAPABILITY 4: FOCUSES ON ENABLING MULTIPLE HETEROGENEOUS HIGH DENSITY URBAN OPERATIONS

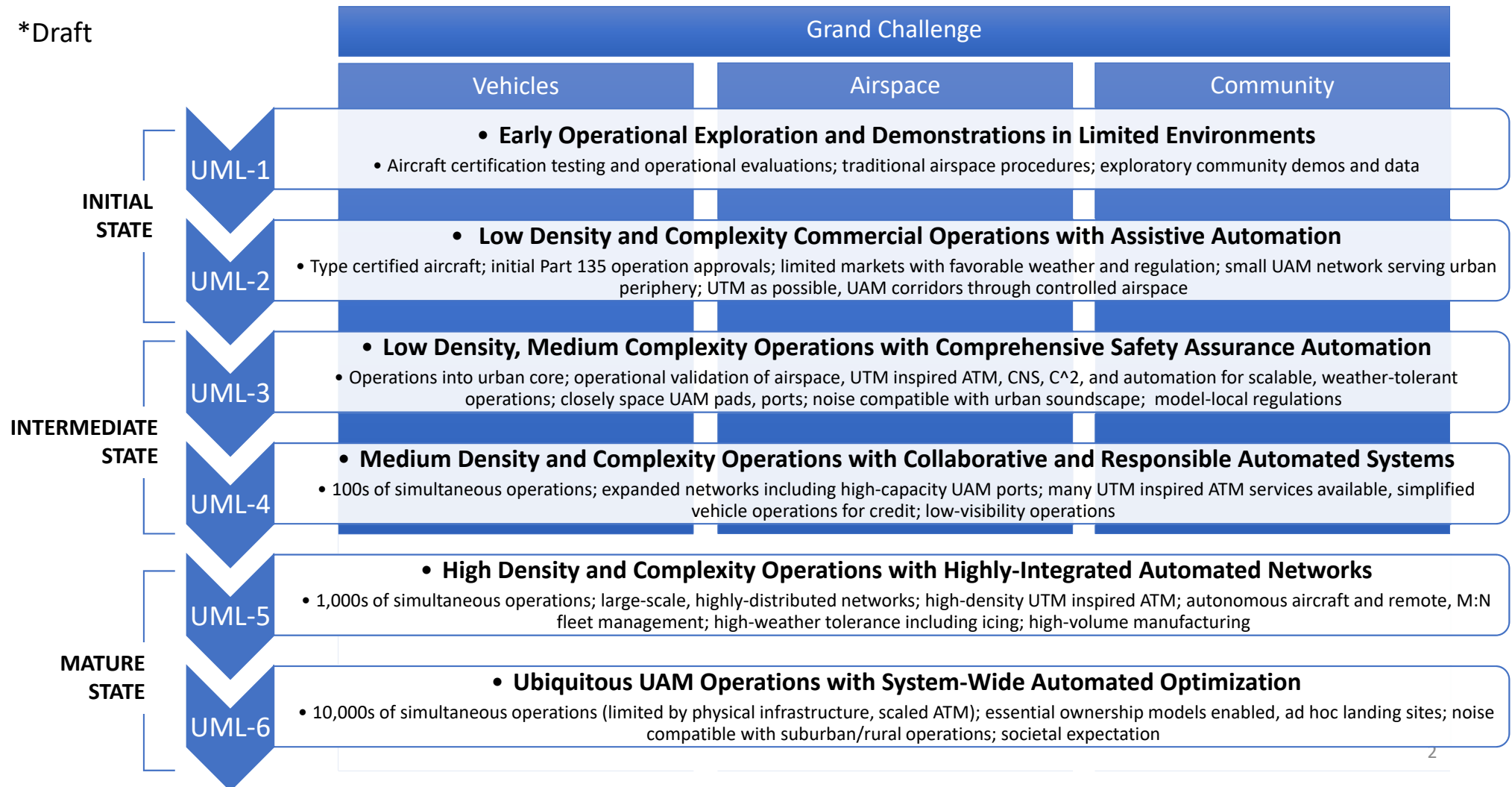
- Beyond visual line of sight
- Urban environments, higher density
- Autonomous V2V, internet connected
- Large-scale contingencies mitigation
- Urban use cases

Product: Requirements to manage contingencies in high density, heterogeneous, and constrained operations

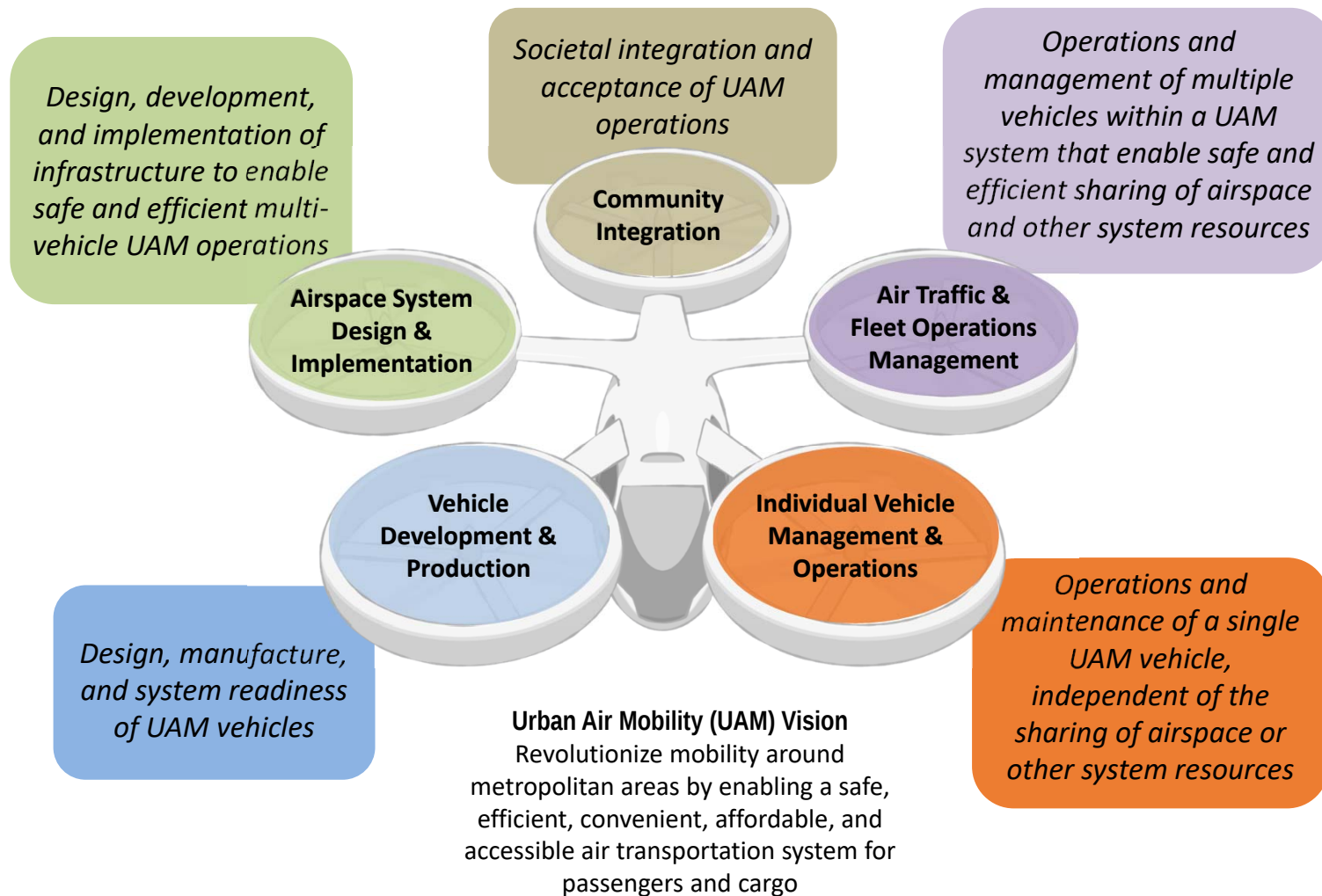
Risk-based approach: depends on application and geography

Urban Air Mobility Maturity Levels (UML)

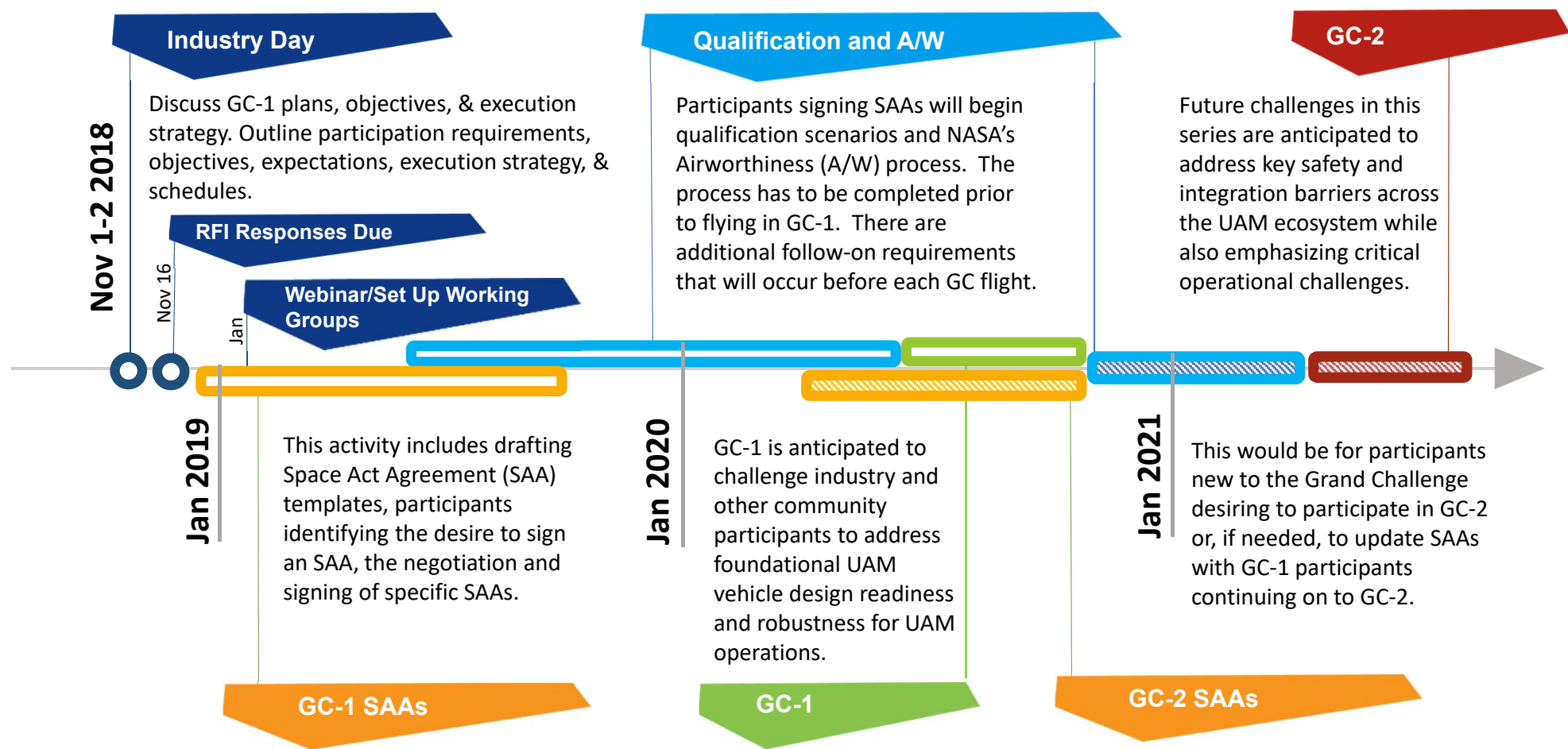
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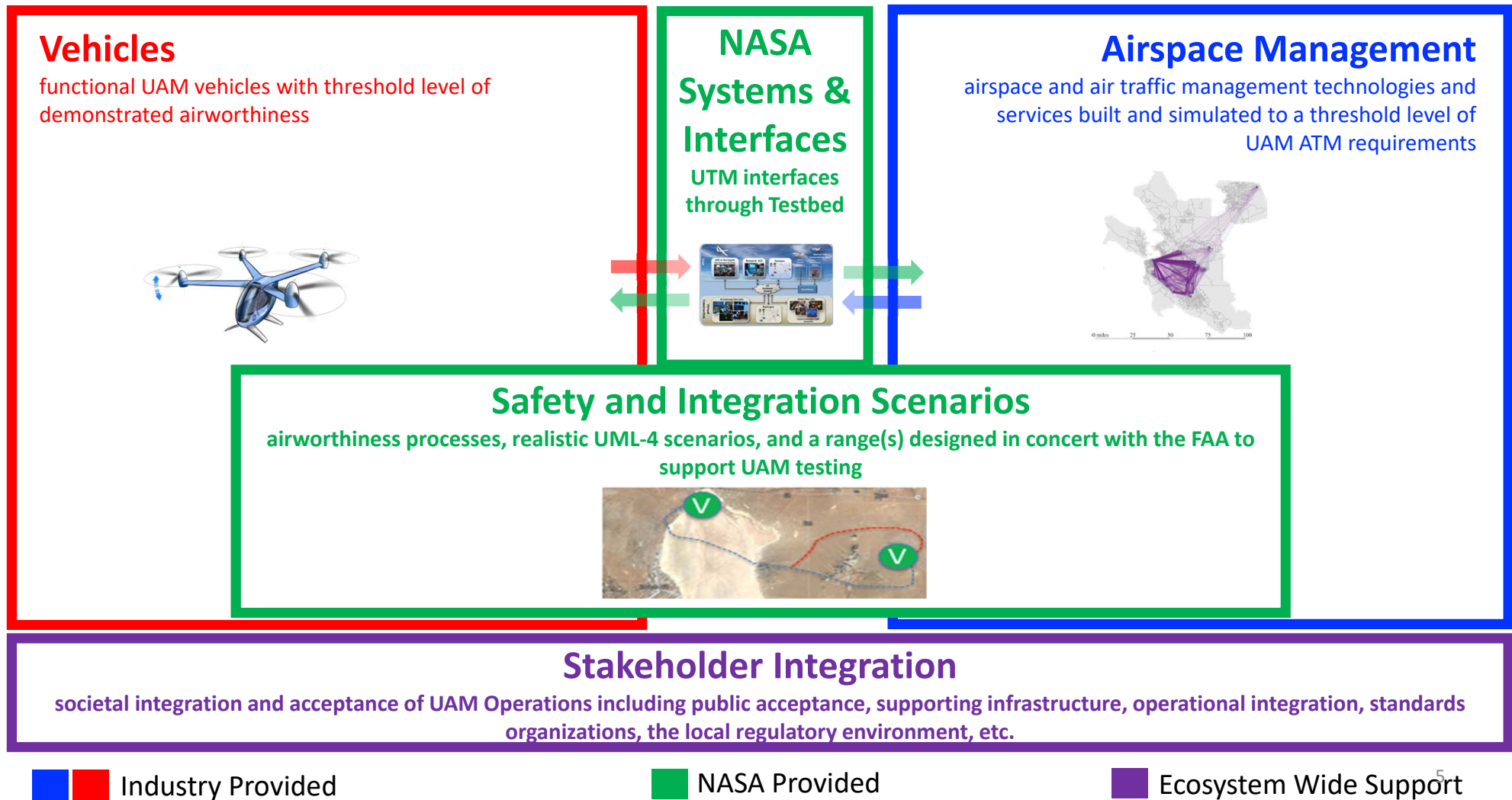
UAM Vision and Framework



NASA UAM Grand Challenge Timeline



2020 Grand Challenge (GC-1) Overview



GC Vehicle and Airspace Management Participants

Vehicles

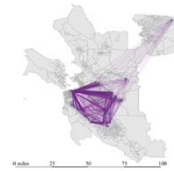
functional UAM vehicles with threshold level of demonstrated airworthiness



- Provide vehicle design and development data to support airworthiness approvals
- Conduct “experimental” class flights to benchmark vehicles and demonstrate ability to handle simple failures and contingencies
- Conduct Safety and Integration Scenarios for Grand Challenge including pre-defined interfaces with Airspace Management systems

Airspace Management

airspace and air traffic management technologies and services built and simulated to a threshold level of UAM ATM requirements



- Provide UAM ATM technologies that meet initial ATM-X provided requirements and Interface Control Documents (ICD)
- Demonstrate capabilities will meet the ICD benchmark and contingency simulations or live testing
- Conduct Safety and Integration Scenarios for Grand Challenge including pre-defined interfaces with vehicle systems



Safety and Integration Scenarios

Stakeholder Integration