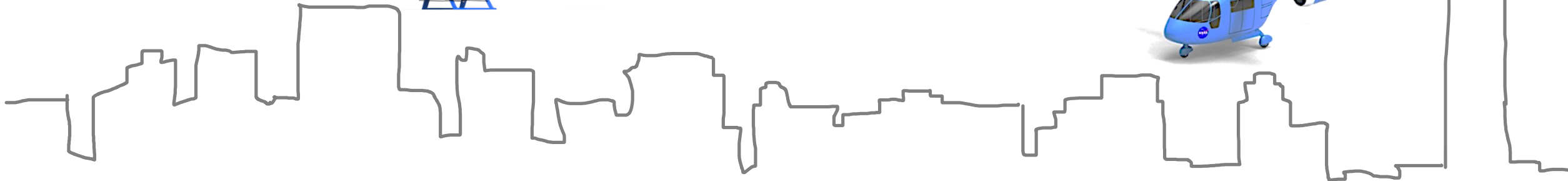


UAM Community Noise Test Planning



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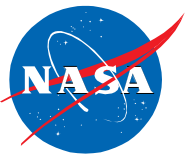
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Session 2aNS, Methods for Community Noise Testing and Analysis I

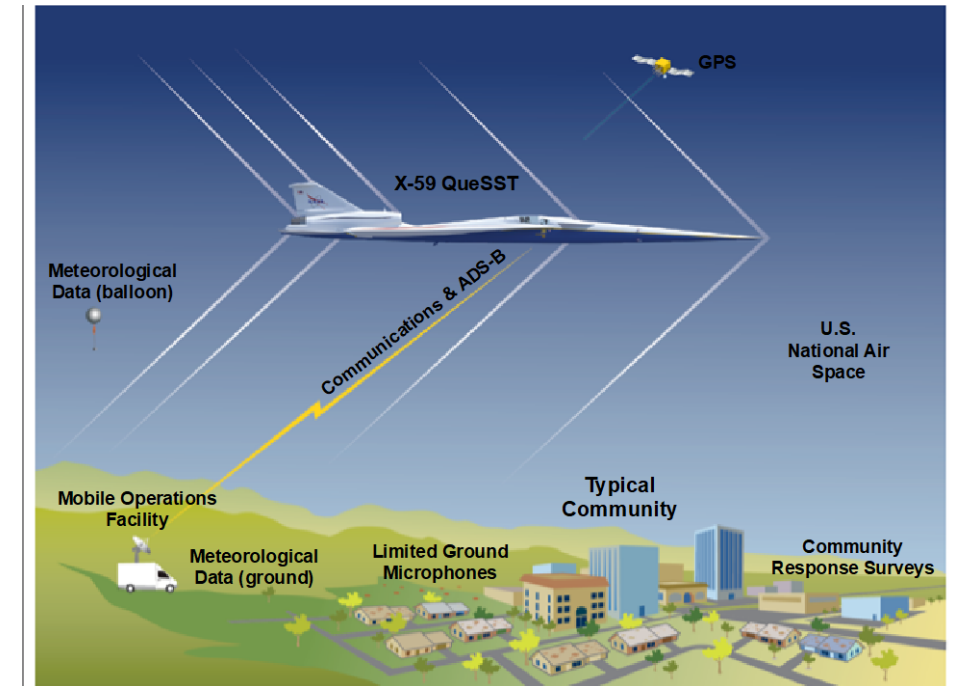


UAM Community Response Tests



- Goal: Acquire community response data that can be used by the FAA to inform future national noise policy
- Approach:
 - Develop test plan for FAA-led UAM community response tests to be conducted in the late 2020s
 - Draft set of candidate test objectives
 - Solicit feedback from stakeholders and update as needed
 - Plan and execute research activities in preparation for tests
 - Leverage current NASA-led UAM research
 - Address gaps with new cooperative NASA-FAA research activities

- Desired outcome: acquire community response data that can be used by the FAA to inform national noise policy
- Types of community response tests
 - **LBFD-like staged test**
 - The only option for supersonic research due to current ban on commercial operations over land
 - Provides single event and short-term annoyance (due to a single flyover or collection of flyovers)



Staged Community Response Test: single-event annoyance data will be provided to ICAO to set en route certification standards



Commercial Supersonic Transport vs UAM Vehicles



- Market and regulatory needs of CST and UAM are very different
- Staged community studies using the X-59 do not form a good baseline for UAM community noise research

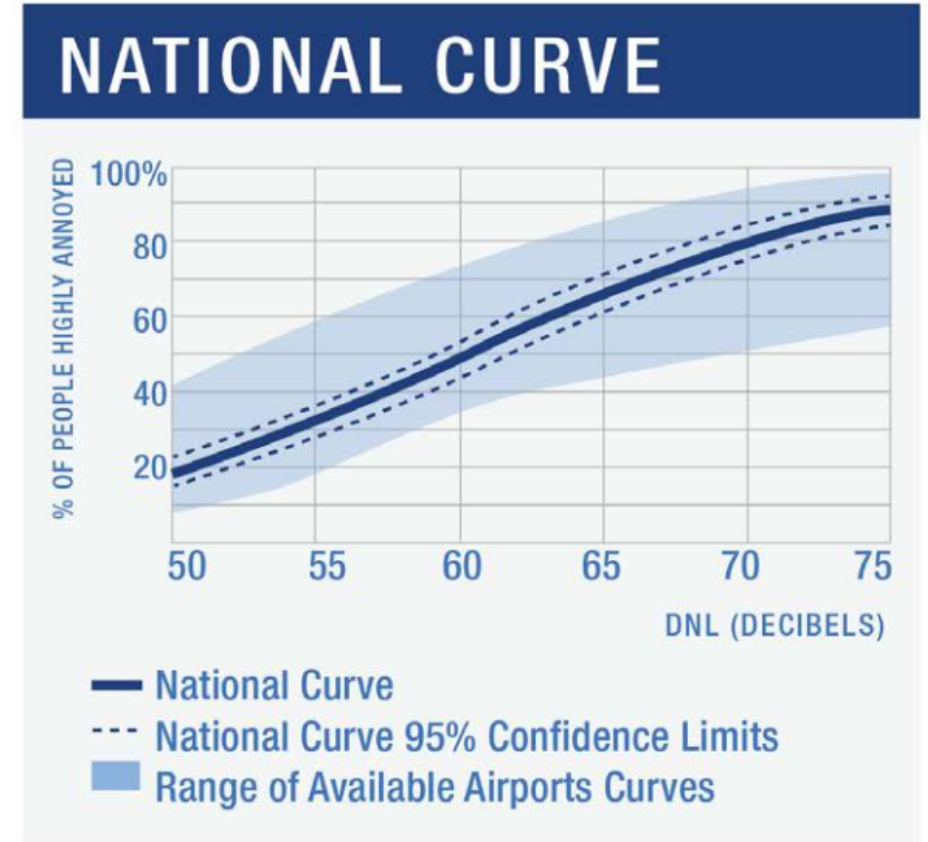
Topic	CST (sonic boom only)	UAM
Noise Certification	Sonic booms are currently banned. Boom metrics, limits, & procedures are TBD.	Current metrics, limits, & procedures <i>may</i> need revision.
Community Noise Assessment	Sonic boom metric is TBD	Default metric is DNL
Regulatory Noise Thresholds	Sonic boom limits are TBD	DNL 65 dB (<i>may need revision</i>)
Expected Frequency of Operations	Few booms/day per observer	Many flyovers/day per observer
Regions of Noise Impact	En route due to sonic booms	Airport/vertiport vicinity and en route due to flyover noise
Role of Demonstrator Vehicles	Regulatory risk too high for commercial entrants. Gov't demonstrator needed to reduce risk.	Regulatory risk manageable for commercial entrants but seek to reduce uncertainties



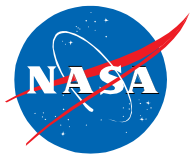
UAM Community Response Tests



- Desired outcome: acquire community response data that can be used by the FAA to inform future national noise policy
- Types of community response tests
 - Lbfd-like staged test
 - The only option for supersonic research due to current ban on commercial operations over land
 - Provides single event and short-term annoyance (due to a single flyover or collection of flyovers)
 - **Observational study**
 - Need certificated vehicles flying over populations for long periods of time
 - Goal is to assess long-duration community response
 - [FAA Neighborhood Environmental Survey](#) is the gold standard for this type of test



Long-term dose-response curve establishes the relationship between noise (dose) and annoyance (response)

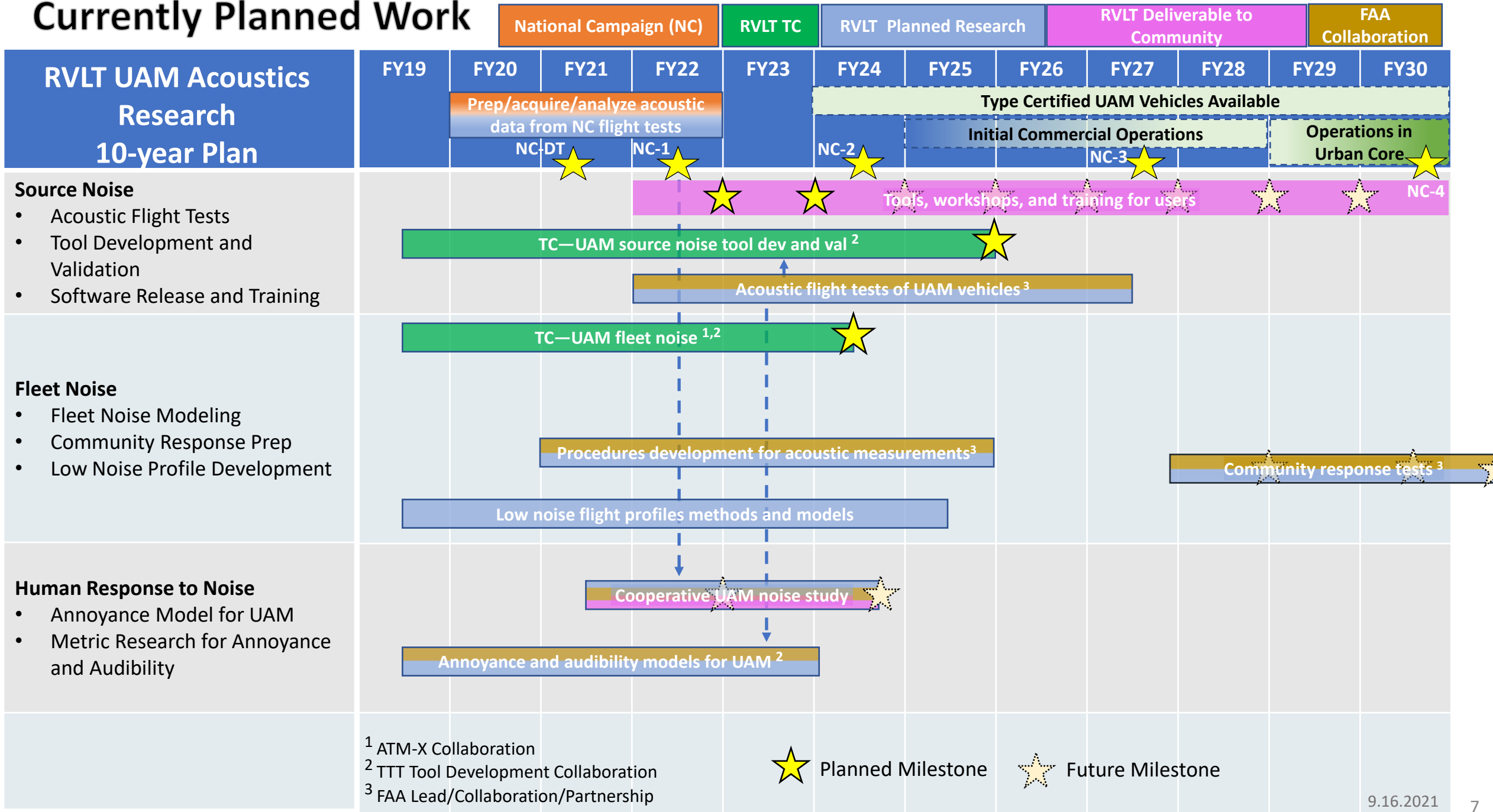


Large Fixed-Wing Transport vs UAM Vehicles

- Some aspects of large fixed-wing transport noise research are relevant for UAM vehicles, but some are not
- FAA NES is a relevant approach for planning UAM community response testing after operations are established

Topic	Large Transport	UAM
Noise Certification	Metrics (single event), limits, & procedures are well established	Current metrics, limits, & procedures <i>may</i> need revision.
Community Noise Assessment	Default is DNL	Default is DNL
Regulatory Noise Thresholds	DNL 65 dB	DNL 65 dB (<i>may</i> need revision)
Regions of Noise Impact	Airport vicinity and Terminal Area due to takeoff and approach noise	Airport/vertiport vicinity and en route due to flyover noise
Vehicle Configurations	Configurations are similar	Significant diversity
Source noise	Certification data widely available, limited high fidelity source data available	Limited data available
Noise Characteristics	Simple source directivity, short duration, steady attributes	Unknown source directivity, longer duration, unsteady attributes
Dose Modeling	Validated prediction methodology	Prediction methodology under development
Operations	Established operations w/ sufficient # of people in different noise contours	Initial operations expected in 5 years, limited noise exposure in first few years

Currently Planned Work



¹ ATM-X Collaboration

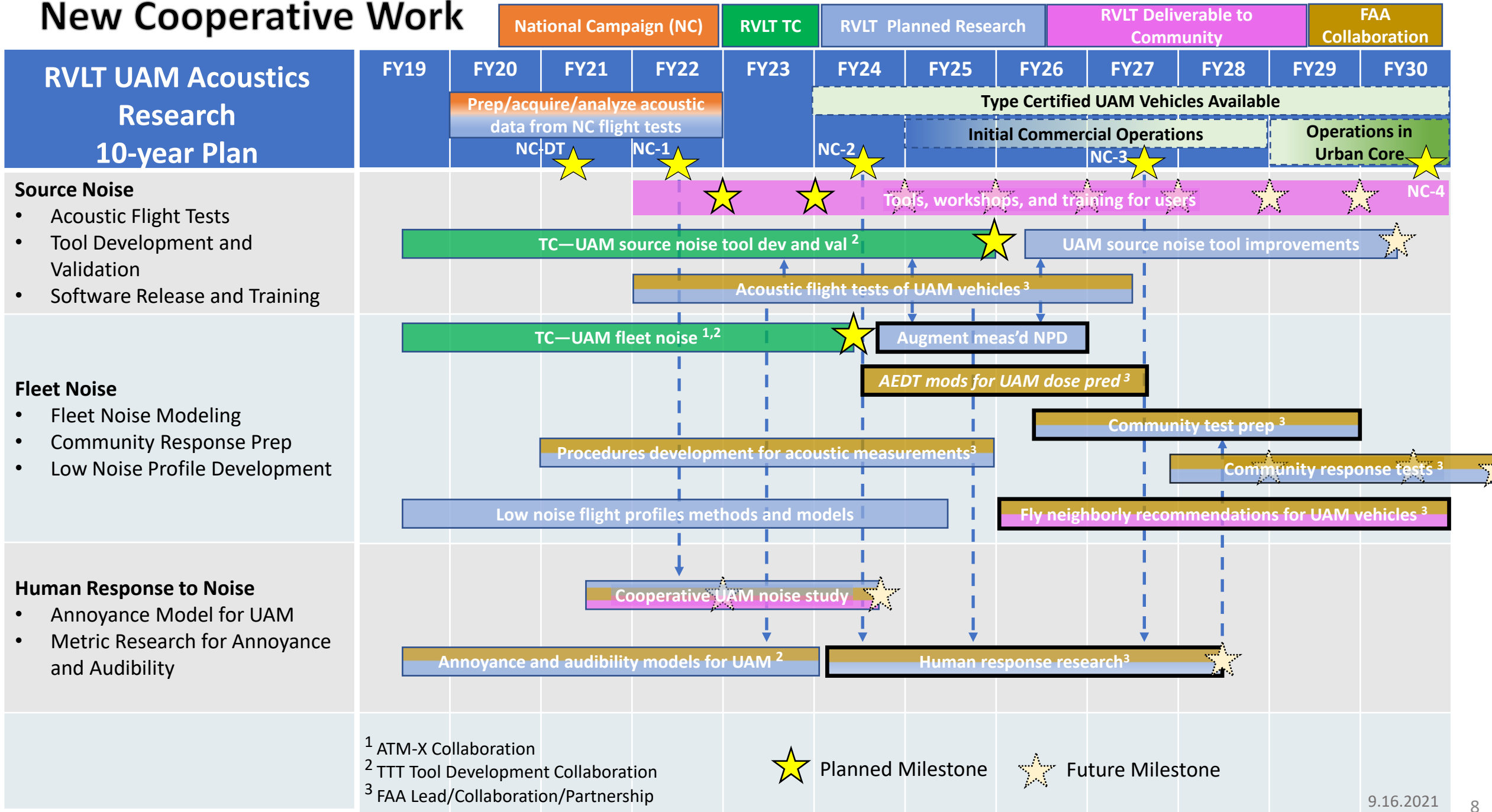
² TTT Tool Development Collaboration

³ FAA Lead/Collaboration/Partnership

★ Planned Milestone

☆ Future Milestone

New Cooperative Work





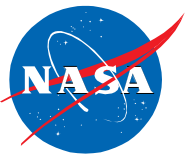
Some Candidate Test Objectives



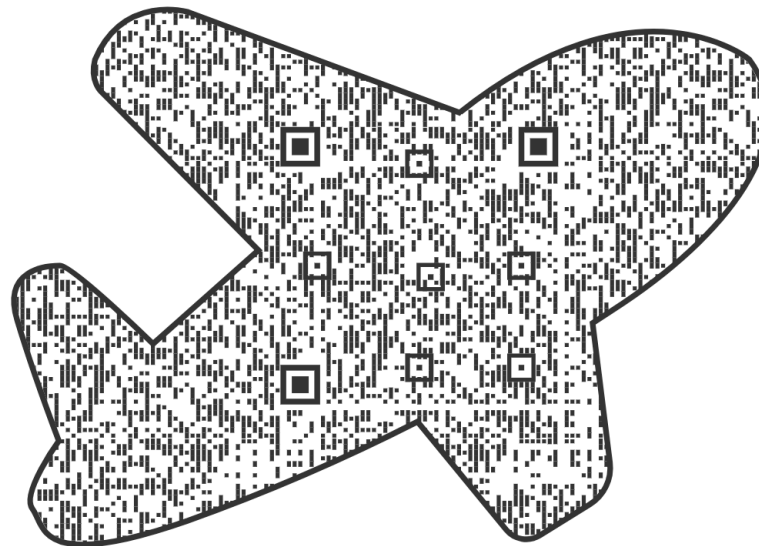
- Effect of number of operations on annoyance
- Efficacy of currently used LAeq based metrics (e.g., DNL, DENL/CNEL)
- Tempo of operations
- Response differences by setting (e.g., near vertiport vs away from vertiport)
- How does the community react to the introduction of a brand new noise source (e.g., PBN)
 - Habituation – what time frame... weeks, months, ?
 - Managing initial introduction vs steady state
 - Possible longitudinal study
- Changes in average background noise level as a function of operations as an alternative metric
- Differences between AAM and other passenger aircraft when considering
 - Sleep disturbance
 - Treatment of noise sensitive sites
 - ...
- Operations
 - How to adapt Fly Neighborly to AAM type vehicles
 - Both directivity and temporal changes in noise with diff operations
 - Dispersion (parallel paths) vs serial when considering many vehicles



Next Steps



- NASA and FAA:
 - Continue to execute existing activities
 - Continue to formulate new cooperative activities to address gaps
 - Update draft plan based on stakeholder feedback
- ASA Participants
 - Provide your feedback to larc-unwg@mail.nasa.gov over next 60 days
 - Most interested in feedback on test objectives, but please feel free to comment on any part of the draft plan



QR Code for Email

Current and New Work

