Regional Tensions

Life in America

- Loss of wealth
- Some pick up in economy due to defense spending
- Job situation improving
- Career dislocation
- Jobs coming back home
- Population more accepting of government involvement
  - taxes higher
  - deficit not a big problem -- can borrow
  - government policies developed to spur U.S. economy
- Re-education is a big business -- government financed
- Aged population -- have time but not money
  - short hall transportation demand
- Some areas of country experience real estate values decline
Regional Tensions

Nature of threat to security

- Conflict on periphery of blocs
  - potentially massive attacks
- War possible between China and Japan/Russo/India blocs
- Threat to oil supply and other critical raw material
  - Israel still a point of contention
- China powerful & unpredictable
  - openly belligerent
  - don’t like US
  - Taiwan conflict point
  - China has ICBM
- Anglo world of shared values worth protecting
- Nuclear proliferation
  - Pakistan
  - Iran/Iraq
Regional Tensions

US Strategic goals

• Deal with world situation (not change it)
  • recognize realities of regionalism
• Strategic goals
  • A. Contain Chinese Expansion
  • B. Recover inter-regional markets
  • C. Protect home regions
  • D. Assured supply at critical natural resources & energy
  • E. Prevent world war.
  • F. Unify US society
Regional Tensions

Needs

• 1. Regional industrial capability (ABCEF)
  • defense hardware (multiplicity of sources)
  • commercial products (reduce costs without using low cost labor)
• 2. Regain skilled domestic labor force (BCF)
  • engineers/scientists
  • skilled shop labor
• 3. Rapid, reliable and flexible distribution capability (ABD)
• 4. Capability to project military force (ACDE)
• 5. Develop alternative domestic energy sources (BCDE)
• 6. Reverse stratification of society (CF)
• 7. Secure communication/IT system (BCF)
• 8. Global awareness/intelligence(ABCDE)
• 9. Improvement in transportation infrastructure (BCF)
• 10 Defensive military capability
• 11 Enhance infectious disease defense
Regional Tensions

Opportunities

- Rebuild design/manufacturing/distribution/communication/IT industry base of US (1 2 3 6 7 9)
  - capitalize on infotech and university/industry/government partnership to attain
    - flexible
    - fast to response
    - low cost
    - rapid introduction of new materials
- Reinvigorate US education system/change motivation of work force (1 2 6)
- Dominate built in regional market successfully compete for South America (1 2 3 4 5 7 8 9)
- Develop energy technology (1 5 9)
- Combine long range force projection & transport in same vehicle [defensive commercial transports] (3 4 9)
- Efficient short range transportation (1 3 4 6 9)
- Limited resources require duel use
  - transport
  - communications
  - global awareness
- Stealth technology
- Missile defense
- Quick, cheap non-human access to space
- Utilize residual infrastructure more efficiently/effectively
Regional Tensions

Aeronautic Opportunities/Innovations/Breakthroughs

• Unstaffed or autonomous ATC -- Navigation, collision avoidance, terminal landing system, weather avoidance
  • system self contained in aircraft
• Quick, cheap, on demand, non-human access to space
  • military -- place assets in space faster then enemy can destroy (surveillance, missile defense, communications, navigation, weather)
  • civil -- communications, navigation, surveillance, weather, mercenary use
  • Aero ops -- air breathing first stage, aircraft like operations
• Virtual Smart Universal Aircraft Factory
  • integrated modeling and simulation vehicle design /manufacturing /maintenance /operations /total system optimization...)
  • produces many variations of basic system
  • easy changes/reconfigurable
  • build to replace attrition or as needed
  • open architecture
  • different sizes and capabilities
  • universal flying qualities
• Uninhabited Aerial Vehicle’s
  • surveillance
  • cargo
  • combat
  • communications
Regional Tensions

Aeronautic Opportunities/Innovations/Breakthroughs (cont’d)

- Short to medium haul, infrastructure independent (e.g. minimal landing area, autonomous ATC, bare base) transport aircraft, stealthy
  - military -- multi-role, (e.g. special forces)
  - civil transportation in --
    - South America;
    - short haul dense market;
    - support for dispersed manufacturing locations
- Extremely long range, large, super sonic, transport aircraft
  - military --
    - force projection, precision airdrop
  - civil --
    - high value industrial product distribution
    - passenger transport to make better use of scarce transport infrastructure
- Controlled observable/low noise
  - military -- anti-stealth
  - commercial stealth (defense of civil aircraft reduced observability near airports)
- Skill targeted education system
  - core education
  - followed by targeted training
  - industry is the campus for targeted education
  - Defense Education Act of 2020
Regional Tensions

Top Aeronautic Opportunities /Innovations /Breakthroughs

- Unstaffed or autonomous ATC -- Navigation, collision avoidance, terminal landing system, weather avoidance
  - system self contained in aircraft
- Virtual Smart Universal Aircraft Factory
  - integrated modeling and simulation vehicle design /manufacturing /maintenance /operations /total system optimization...
  - safe and reliable at system level
  - produces many variations of basic system
  - easy changes/reconfigurable
  - build to replace attrition or as needed
  - open architecture
  - different sizes and capabilities
  - universal flying qualities
- Short to medium haul, infrastructure independent (e.g. minimal landing area, autonomous ATC, bare base) transport aircraft, stealthy
  - military -- multi-role, (e.g. special forces)
  - civil transportation in --
    - South America;
    - short haul dense market;
    - support for dispersed manufacturing locations
- Extremely long range, large, super sonic, transport aircraft
  - military --
    - force projection, precision airdrop
  - civil --
    - high value industrial product distribution
    - passenger transport to make better use of scarce transport infrastructure
Regional Tensions

Second Tier Aeronautic Opportunities /Innovations /Breakthroughs

- Skill targeted education system
  - core education
  - followed by targeted training
  - industry is the campus for targeted education
  - Defense Education Act of 2020
- Uninhabited Aerial Vehicle’s
  - surveillance
  - cargo
  - combat
  - communications
- Controlled observable/low noise
  - military -- anti-stealth
  - commercial stealth (defense of civil aircraft reduced observability near airports)
- Quick, cheap, on demand, non-human access to space
  - military -- place assets in space faster then enemy can destroy (surveillance, missile defense, communications, navigation, weather)
  - civil -- communications, navigation, surveillance, weather, mercenary use
  - Aero ops -- air breathing first stage, aircraft like operations
Regional Tensions

Physical/Technology/Systems

• Unstaffed or autonomous ATC -- Navigation, collision avoidance, terminal landing system, weather avoidance
  • system self contained in aircraft
• Communication, bandwidth, management
• Upward communication only
• Data management
• Reliable, communication
• Pilot workload
• Shifting paradigm at system level
• Component of fully automated total air transportation system
• Cooperative ATC
• UAV
• Robust to non-cooperators
Regional Tensions

Physical/Technology/Systems

- Quick, cheap, on demand, non-human access to space
  - military -- place assets in space faster than enemy can destroy (surveillance, missile defense, communications, navigation, weather)
  - civil -- communications, navigation, surveillance, weather, mercenary use
  - Aero ops -- air breathing first stage, aircraft like operations

- New air breathing propulsion options
  - Gun launched ram/scram fist stage, rocket insertion stage
  - Ram accelerator, rocket insertion stage
  - Ram accelerate direct to orbit

- Any expendable components must be very cheap to manufacture vehicle
  Technology to support aircraft like ops
  - on demand
  - small support/launch staff
  - robust ops
Regional Tensions

Physical/Technology/Systems

- Virtual Smart Universal Aircraft Factory
  - integrated modeling and simulation vehicle design /manufacturing /maintenance /operations /total system optimization...)
  - produces many variations of basic system
  - easy changes/reconfigurable
  - build to replace attrition or as needed
  - open architecture
  - different sizes and capabilities
  - universal flying qualities

- Integrated product design
  - Concept definition for sales to customer before completing drawings
    - reduced time in all steps at design
  - Almost pre-rehearsed manufacturing before design
  - New design in 18 months
  - Integrated design/manufacturing/certification

- Integrated product manufacturing
  - Total manufacturing strategy established before design completed

Challenges:
- An integrated learning system
- Rule based system that supports innovation
- More universal tooling
  - large integrated structure vs. build up at components
Regional Tensions

Physical/Technology/Systems

• Uninhabited Aerial Vehicle’s
  • surveillance
  • cargo
  • combat
  • communications
• Allocation of piloting functions/degree of autonomy
• Communications links in hostile environment
• flexible payloads
• Propulsion/Energy for long endurance
  • low TSFC
  • cheap manufacturing
Regional Tensions

Physical/Technology/Systems

• Short to medium haul, infrastructure independent (e.g. minimal landing area, autonomous ATC, bare base) transport aircraft, stealthy
  • military -- multi-role, (e.g. special forces)
  • civil transportation in --
    • South America;
    • short haul dense market;
    • support for dispersed manufacturing locations
• STOL, XSTOL, VTOL
  • Integrated propulsion/aerodynamics
• Noise
• Lower TSFC engines
• ATC (see autonomous)
• Manufacturing (see factory)
Regional Tensions

Revolutionary Ideas

- Drag reduction by flowfield modification for SST
- Non fossil fuel based energy sources
- Weather modification
- Components/subsystems flexible/coherent/concurrent technology exploration and demo paradigm
- On/Off stealth
Regional Tensions

Physical/Technology/Systems

- Controlled observable/low noise
  - military -- anti-stealth
  - commercial stealth (defense of civil aircraft reduced observability near airports)
- Skill targeted education system
  - core education
  - followed by targeted training
  - industry is the campus for targeted education
  - Defense Education Act of 2020