

NLI Strategy

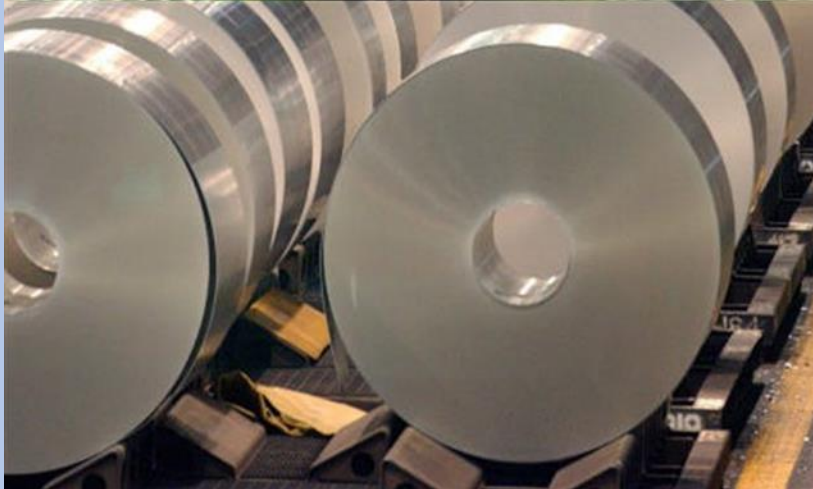


ARM Update

**NATA 2023
Conference**

Normand Landry

2 May 2023



Alternate Runway Material (ARM) - Aluminum Construction

Topics

Continuing Work – Sponsored by the Aluminum Valley Society (AVS)

- Who is the AVS?
- Update on work
- Panels Description
- Laying out the panels
- Work Packages
- Winter Operations Testing Plan
- Flight Performance – 29 Palms
- Tentative Schedule



Aluminum Valley Society (AVS)

WHO?

- It is an attraction and innovation hub in the fields of aluminium transformation and specialized equipment manufacturing. involved in the transformation of Aluminum.
- Composed of 130 member companies that create over 3,000 jobs.

WHY?

- One of the goals of the AVS is to identify and develop projects to the point where industry take it over and commercialize it.
- Need to demonstrate the value of the new technology and market potential.
- The projects get transferred to industry once they are ready for commercialization.

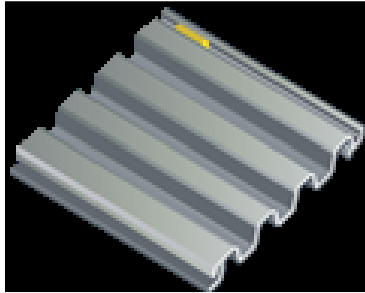
Aluminum Valley Society (AVS)

STUDIES DONE

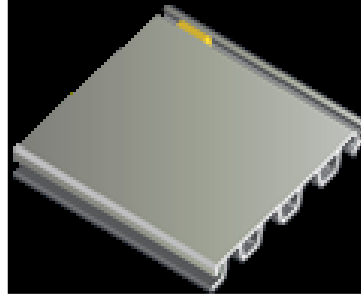
- Market Study x **Also investigating Military Requirements**
- Operational Feasibility
- Financial Feasibility
- Compliance Demonstration – Next Step

Summary of primary markets				
Country	Area (sq ft)	Volume (cu ft)	Weight (lbs)	Weights (tons)
Canada	6,931,500	311,918	48,520,500	24,260
Brésil	9,000,000	405,000	63,000,000	31,500
Totaux	15,931,500	716,918	111,520,500	55,760

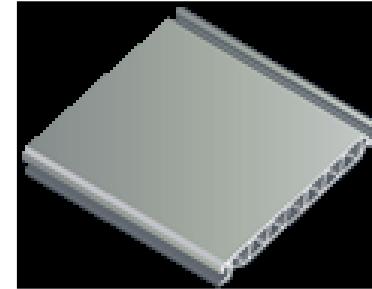
Panels Description



(a) PSA



(b) PSA FT

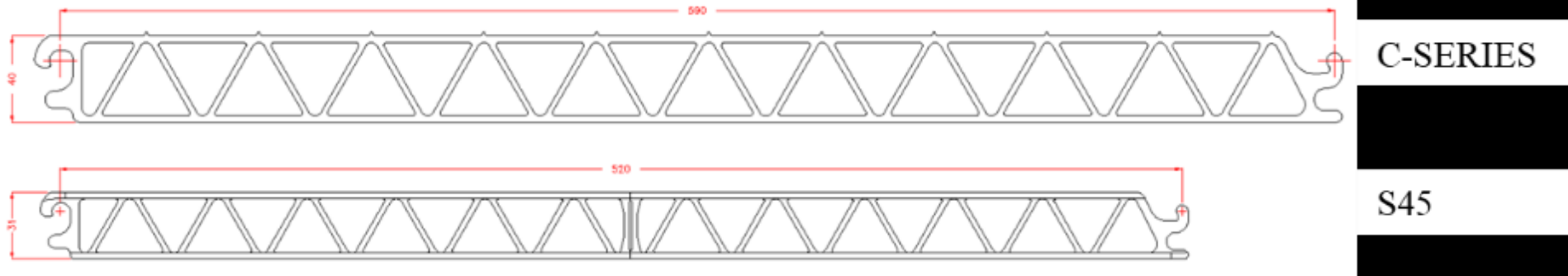


(c) S45

- PSA – Maximum weight of up to 80 tonnes – Currently used at 29 Palms
- PSA FT – Can withstand weights of more than 80PSI, depending upon tire pressure and the CBR of the ground.
- S-SERIES (S45) – Can withstand a maximum of 325psi, Can support the landing of helicopters and heavy military aircraft. Needs SFW to get width.

Panels Description

- C-series - A slightly modified version of S45. Does not require FSW as it is a wider panel.



- New C-Series panel developments – New anti-skid finish
- Details still confidential
- Advantages:
 - More durable
 - Less maintenance
 - Easier winter maintenance operations

Laying out panels

- Easy to assemble
- No specialized training
- No specialized equipment



AVS Work Packages

Phase 1 - Material Characterization and Testing – Acceptance by TC – Boeing – Operators

- Finalize testing requirements- Sent draft to TC **XX**
- Prepare test plans (above and beyond FTW available data)
- Validate with Transport Canada
- Prepare a revised project cost estimate (FTW/SVA/CIDAL requirements)
- Collect available data (Friction – Strength – Performance)
- Submit results to Transport Canada Aerodrome Standards for concurrence
- Receive approval from Boeing
- Manage the tests to be carried out

AVS Work Packages

Phase 1 – Aerodrome Standards Material Characterization and Testing

“The requirements for compliance of this track system are taken from Transport Canada Advisory Circular 300 series in conjunction with AC 700-011 and AC 525-006. These guidance documents serve to assist operators in compliance with the applicable Standards and Regulations, there will also be a need to have Transport Canada Flight Test requirements included once more info is available”

Some of the testing required

- Strength
- Stiffness
- Fatigue
- CBR
- PCN
- Maintenance Requirements
- Etc.

Draft Test Plan provided to TC for comments.

AVS Work Packages

Phase 2 – Manufacturing Capability - Business Plan

- Business Plan Finalization – Create the Joint Venture

Other Work Packages

Phase 4A – Winter Operations Testing

- Winter Testing - UQAC
- Work with TC (Aerodrome Standards) to define any remaining winter operations data

Phase 4B – Performance Testing – Flight Testing

- Work with TC Flight Tests and Boeing to determine requirements
- Work with 29 Palms to acquire data (On-site visit)
- Prepare data acquisition/Test Plan
- Perform required Flight Tests
- Analyse Data and Present to TC for review

Phase 4C – Fatigue Calculations - Testing

- Establish fatigue limits

Winter operations and De-Icing Testing Plan

- Centrifuge adhesion Test (CAT) – Freezing Drizzle (Baseline for the other tests)
- Skid Tests (6 conditions)
- Compatibility Tests (Fluid impact on material - Corrosion (Bare aluminium and Coated))
- Anti bonding and De-Bonding (Pressure required to remove snow and ice)
- Materials performance (De-icing products)
- Performance in Winter Conditions (12 days of temperatures cycling between -35C and 10C)
- Exposure to Airport Traffic (simulator – passage of wheel on anti-skid – winter conditions) – Friction Testing
- Determine the best de-icing technology - methodology

3-5 months – Ball Park \$100K
Private financing can be leveraged

Flight Operations Witnessing/Testing

- 29 Palms Visit
- Pilot Project – Reduced size Runway for Performance Testing

Real Life Experiences



Real Life Experiences