



LECTURE SERIES SCI-277

on

“Store Separation and Trajectory Prediction”
(Séparation de charges et prédiction de trajectoire)

organized by the

Systems Concepts and Integration (SCI) Panel

to be held at the

Spanish Army Polytechnic School
Madrid, Spain, 21-22 May 2018

Netherlands Aerospace Centre - NLR
Amsterdam, Netherlands, 24-25 May 2018

SAAB AB Training Centre
Linköping, Sweden, 28-29 May 2018

National Research Council Canada
Ottawa, Ontario, Canada, 19-20 June 2018

This Lecture Series is open to citizens
from NATO Nations,
Australia, Finland and Sweden.

Latest registration date:
10 days prior to each event

Enrol on-line at <https://events.sto.nato.int/>

All presentations and discussions will be held in
English

Background

The mission of STO is to conduct and promote co-operative research and information exchange. STO consists of a three level organization: the Science and Technology Board (STB), the Panels and the Technical Teams. The Systems Concepts and Integration (SCI) Panel is one of the seven Panels under the STB.

The mission of the Systems Concepts and Integration (SCI) Panel is to advance knowledge concerning advanced systems, concepts, integration, engineering techniques and technologies across the spectrum of platforms and operating environments to assure cost-effective mission area capabilities.

Theme

Store separation is the process that any new aircraft/weapon combination has to undergo before a flight clearance is issued. This can be done using previous data for existing aircraft and weapons. New aircraft and/or weapons (both internal and external) require extensive CFD, wind tunnel, ground and flight testing.

The store separation process consists of five distinct disciplines conducted by independent groups: aircraft performance, flying qualities, structures, flutter and store release. Prior to store release from the aircraft, each selected aircraft/weapon combination has to undergo extensive aerodynamic and structural analyses and testing. This may take many years to complete. The Joint Strike Fighter (JFS) operational deployment occurred almost ten years after its first flight.

One goal of the lecture series is to bring together individuals that may be working in several independent disciplines and discuss/consider ways the store separation process might be improved. The lecture series will discuss whether aerodynamic, structural and store release flight testing can be combined.

Topics to be covered:

The topics to be covered during the lecture series will include the following topics but will not be limited to:
 Wind Tunnel testing including freestream (Mach, PSI, THE, PHI, appropriate scale), grid (Mach, X, Y, Z, PSI, THE, PHI), Mach Sweep, CTS trajectories, Drop testing, bomb bay.

Thème

Toute combinaison entre un nouvel aéronef et/ou une nouvelle arme doit suivre une analyse du processus de séparation de charges avant que l'autorisation de vol soit donnée. Cela peut être réalisé à l'aide de données antérieures sur les aéronefs et les armes existantes. Les nouveaux aéronefs et / ou armes (à la fois internes et externes) imposent une DFC approfondie, des essais complets en soufflerie aérodynamique, ainsi qu'à terre et en vol.

Le processus de séparation de charges intéresse cinq disciplines distinctes confiées à des groupes indépendants : performances de l'aéronef, qualités de vol, structures, flottement et séparation proprement dite. Avant le largage, chaque combinaison aéronef-arme doit subir des analyses et des essais aérodynamiques et structurels complets, qui peuvent demander plusieurs années. Le déploiement opérationnel du *Joint Strike Fighter* (JSF) a eu lieu presque dix ans après son premier vol.

L'un des objectifs de la série de conférences est de réunir des personnes qui travaillent dans plusieurs disciplines indépendantes pour qu'elles discutent et étudient comment améliorer le processus de séparation de charges. Cette série de conférences discutera en particulier de la possibilité ou non de combiner des essais en vol aérodynamiques, structurels et de séparation de charges.

Sujets traités

Les sujets traités pendant la série de conférences seront notamment les suivants :

Essais en soufflerie aérodynamique incluant l'écoulement libre (Mach, PSI, THE, PHI, échelle appropriée), la grille (Mach, X, Y, Z, PSI, THE, PHI), le balayage du nombre de Mach, les trajectoires CTS, les essais de largage et la soute à bombes.

Lecture Series Director

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SCI-277 RLS - PROGRAMME

DAY ONE

- 8:30 Registration
- 9:00 Opening Ceremony & STO Overview
Prof. Dr Nafiz Alemdaroglu
- 9:15 Effects of Stores on Aircraft Performance
Dr Joseph Nichols (presented by Dr Alex Cenko)
- 10:15 Coffee Break
- 10:30 Effects of Stores on Flying Qualities
Dr Joseph Nichols (presented by Dr Wolfgang Lubert)
- 11:30 Effects of Stores on Aircraft Structures
Dr Wolfgang Lubert
- 12:30 Lunch Break
- 13:30 Store Separation Overview
Dr Alex Cenko
- 14:30 CFD Applications to Store Separation
Prof Nafiz Alemdaroglu
- 15:00 Coffee Break
- 15:30 Tutorial on Trajectory Predictions
Dr Alex Cenko
- 17:30 End of Day 1

DAY TWO

- 9:00 Structural Dynamics and Flutter
Dr Wolfgang Lubert
- 10:00 Coffee Break
- 10:30 CFD Use and Applications to Store Separation and Store Compatibility with Aircraft
Mr Bruce Jolly
- 11:30 Discussion and Questions
- 12:00 Lunch Break
- 13:30 Examples of Structural Dynamic and Flutter Testing
Dr Wolfgang Lubert
- 15:00 Coffee Break
- 15:30 CFD Challenges and Future Plans in Application with Store Separation
Mr Bruce Jolly
- 16:30 Improvements in Aircraft/Weapon Integration
Dr Alemdaroglu, Dr Cenko, Dr Lubert, Mr Jolly
- 17:30 Closing Remarks
Prof. Dr Nafiz Alemdaroglu
- 17:45 End of Day 2

HOW TO ENROLL

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Note: If this is the first time you use the Events Management System you will need to create an account by clicking on 'Create an account' under the Log in blue button. Then follow the instructions and create your profile. Please note that participants are to make their own travel arrangements and hotel bookings.

If you are unable to enrol via the internet, please contact sci@cs0.nato.int

For any questions

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