SESP 2015 – MathWorks Presentation
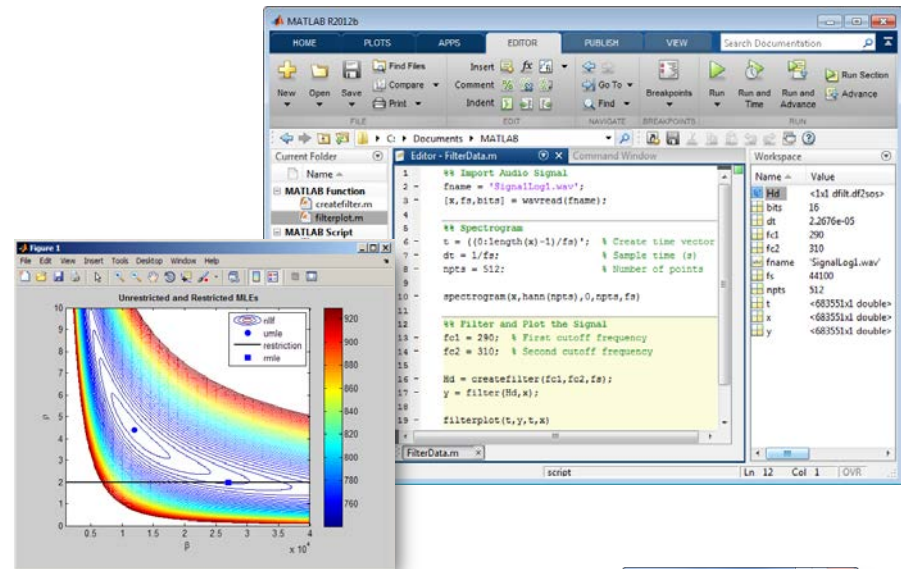
Albert Ramírez Pérez

Industry Marketing - MathWorks

Core MathWorks Products
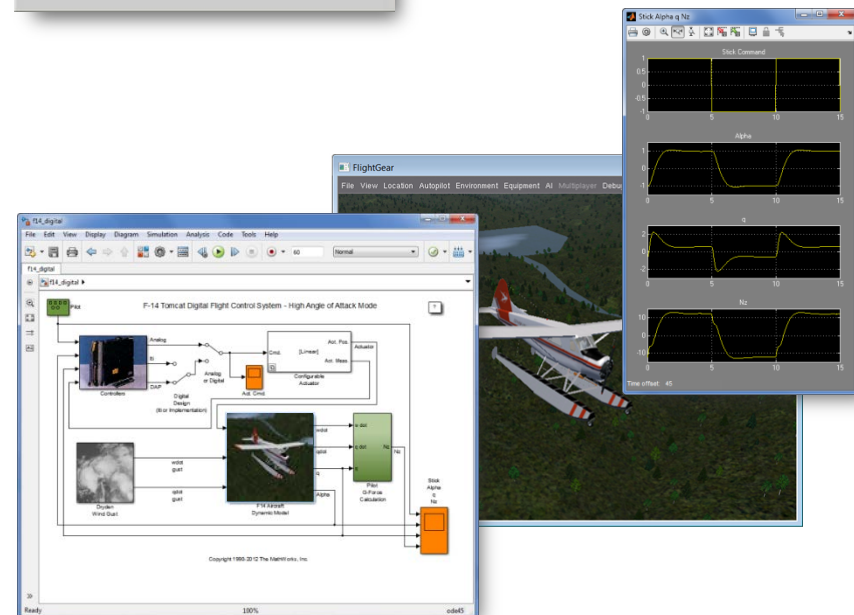
MATLAB®
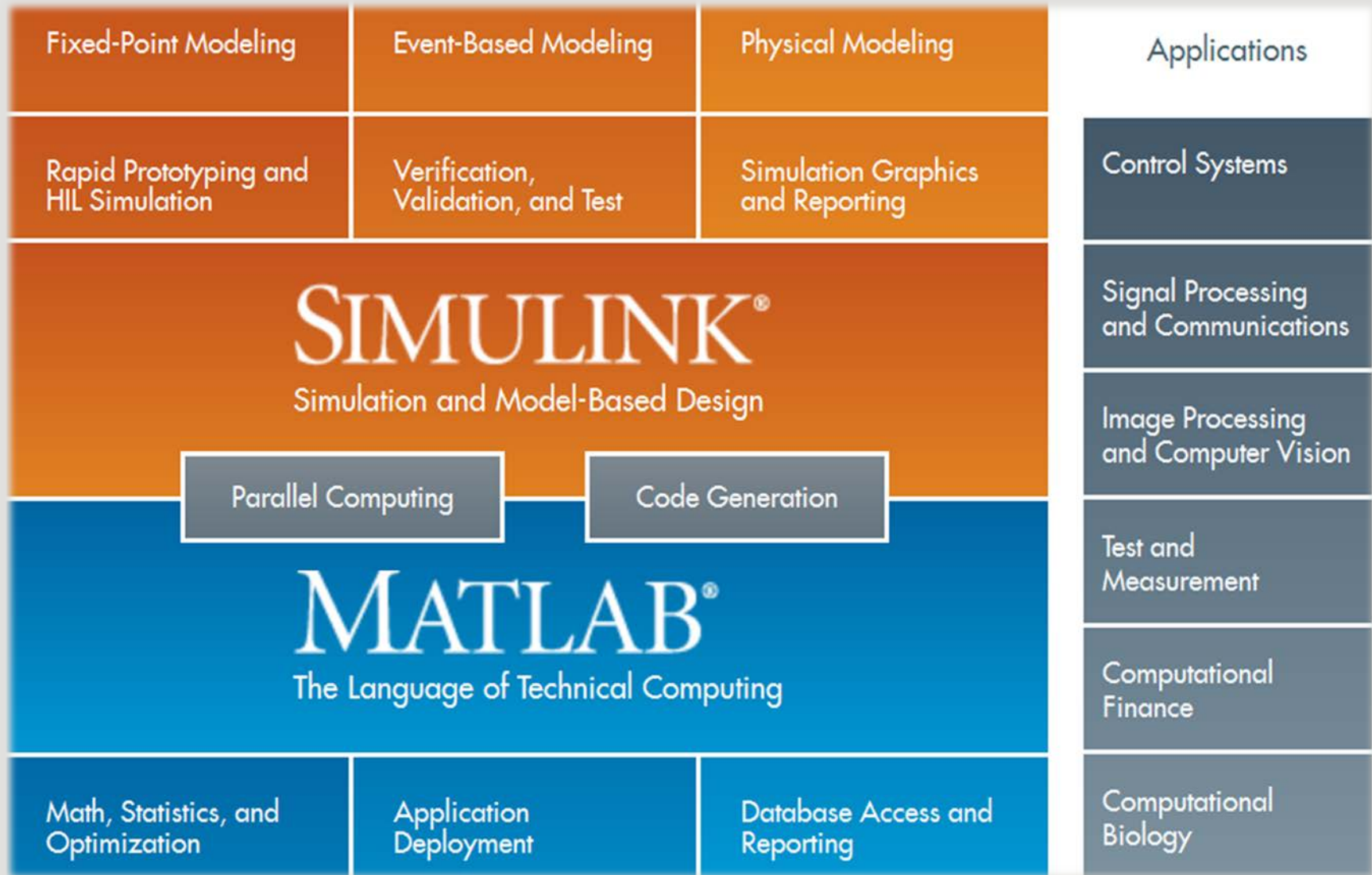
The leading environment for technical computing

SIMULINK®

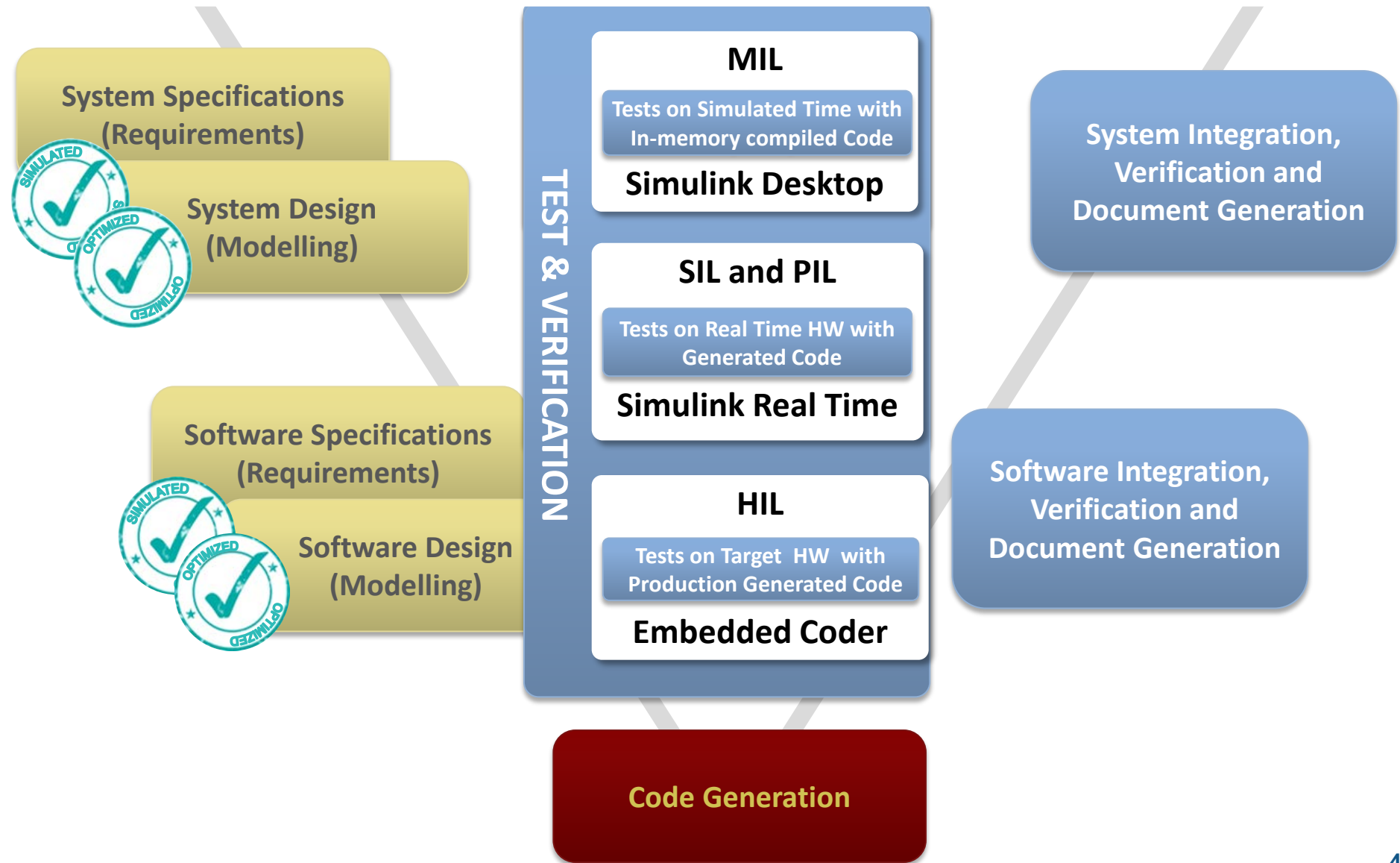The leading environment for modeling, simulating, and implementing dynamic and embedded systems

MathWorks Product Overview

Space development workflow driven by MBD

Better Communication, Early verification and Higher Product Quality

MathWorks

System Specifications (Requirements)

System Design (Modelling)

Software Specifications (Requirements)

Software Design (Modelling)

TEST & VERIFICATION

MIL

Tests on Simulated Time with In-memory compiled Code

Simulink Desktop

SIL and PIL

Tests on Real Time HW with Generated Code

Simulink Real Time

HIL

Tests on Target HW with Production Generated Code

Embedded Coder

System Integration, Verification and Document Generation

Software Integration, Verification and Document Generation

Code Generation

4

Multidomain Modeling and Simulation

MathWorks

Continuous-time

Dynamic systems

Discrete-time dels

Difference Equations

Physical models

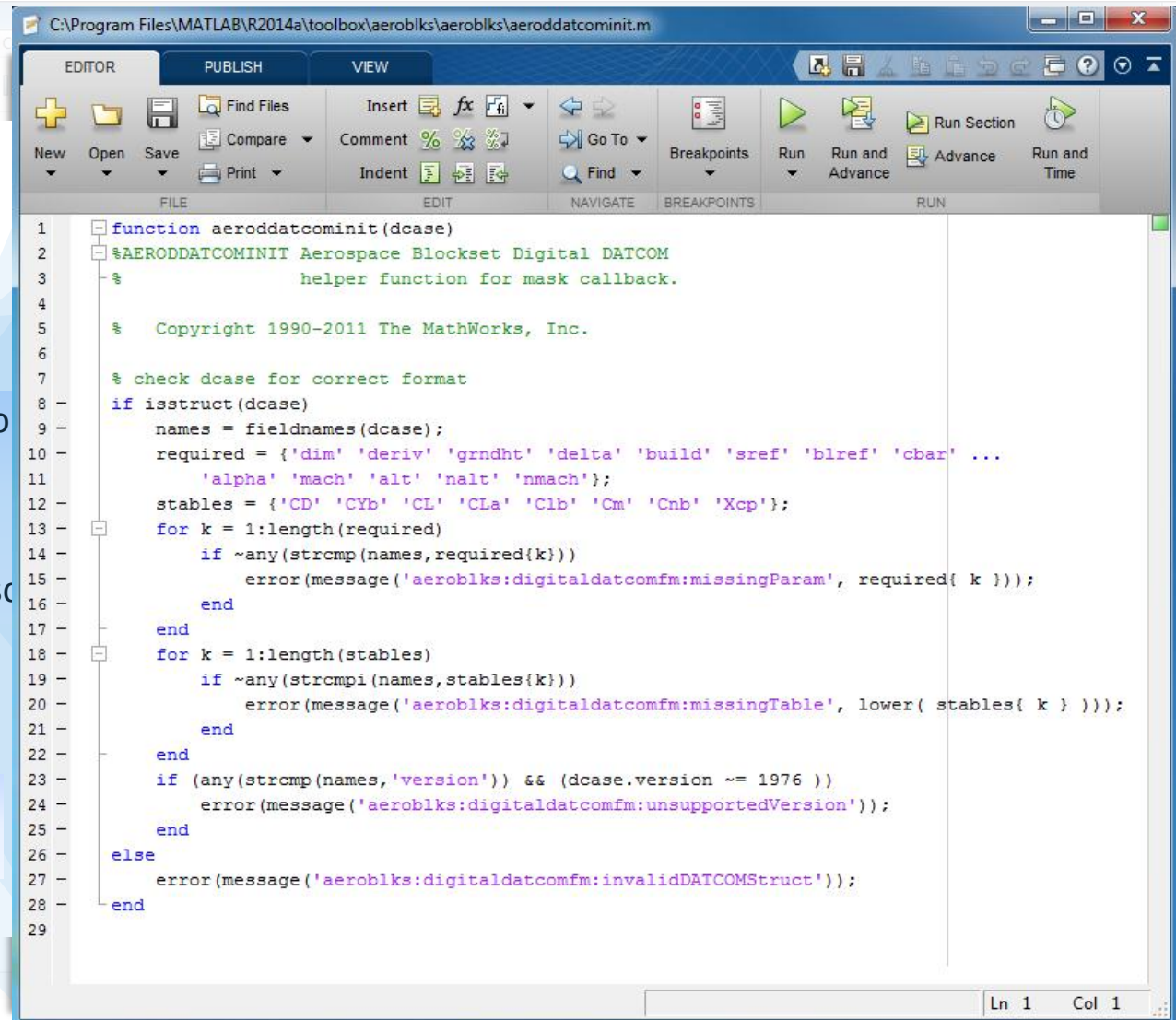Differential Algebraic Equatio

State machines

Control logic

rough Simso

Discrete-event

Latency

MATLAB

Desktop
Embedded

```matlab
function aeroddatcominit(dcase)
%AERODDATCOMINIT Aerospace Blockset Digital DATCOM
%                helper function for mask callback.
%
%    Copyright 1990-2011 The MathWorks, Inc.

% check dcase for correct format
if isstruct(dcase)
    names = fieldnames(dcase);
    required = {'dim' 'deriv' 'grndht' 'delta' 'build' 'sref' 'blref' 'cbar' ...
        'alpha' 'mach' 'alt' 'nalt' 'nmach'};
    stables = {'CD' 'CYb' 'CL' 'CLa' 'Clb' 'Cm' 'Cnb' 'Xcp'};
    for k = 1:length(required)
        if ~any(strcmp(names,required{k}))
            error(message('aeroblks:digitaldatcomfm:missingParam', required{ k }));
        end
    end
    for k = 1:length(stables)
        if ~any(strcmpi(names,stables{k}))
            error(message('aeroblks:digitaldatcomfm:missingTable', lower( stables{ k } )));
        end
    end
    if (any(strcmp(names,'version')) && (dcase.version ~= 1976 ))
        error(message('aeroblks:digitaldatcomfm:unsupportedVersion'));
    end
else
    error(message('aeroblks:digitaldatcomfm:invalidDATCOMStruct'));
end
```
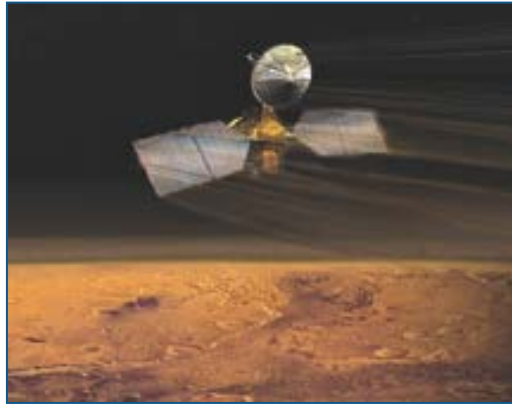
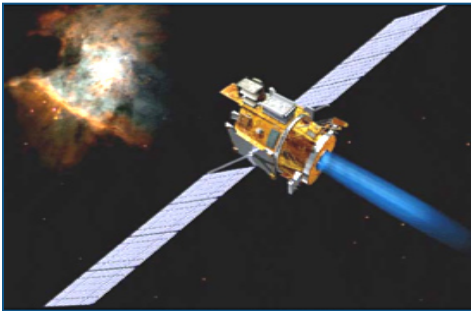C:\Program Files\MATLAB\R2014a\toolbox\aeroblks\aeroblks\aeroddatcominit.m

MathWorks in Space

Artist's rendition of Mars rover.
Graphics courtesy of NASA/JPL/Cornell.

Deep Space 1 spacecraft.
(Image courtesy of NASA/JPL/Caltech)

NASA's Ares I rocket.

Artist's rendition of Mars Reconnaissance
Orbiter. (Image courtesy of NASA.)
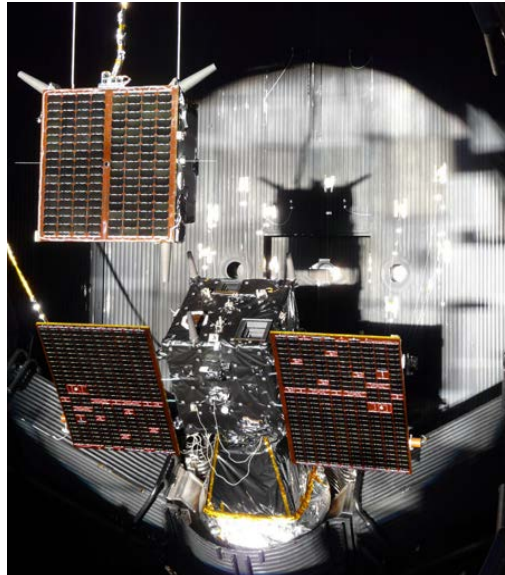
Prisma's Mango and Tango satellites in
the sunbeam of the space simulator

Ariane 5 launcher taking off.

Rendering of the
WorldView-3 satellite.