



TRAINING SESSIONS

18th October 2021

Innovative packaging solutions for storage and conservation of 20th century cultural heritage of artefacts based on cellulose derivative



HIGH O₂
BARRIER AND
ACTIVE
PACKAGING



ACTIVE ACID
ADSORBERS



MULTI-SCALE
MODELLING



GAS
DETECTION
SENSORS



PACKAGING
WITH MODULAR
DESIGN



CURATIVE
PACKAGES



NEMOSINE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760801.



IoT solutions in Cultural Heritage. Wireless sensor control in film archives.



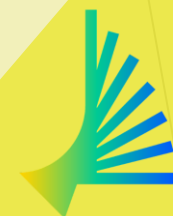
José Luis Fernández Angulo
Senior Mechatronics Engineer



José Javier Ruiz
Software Engineer



NEMOSINE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760801.



IRIS



Objectives

Development of a taylormade **Wireless Sensor Network** for the **quick periodic review** of Cultural Heritage collections

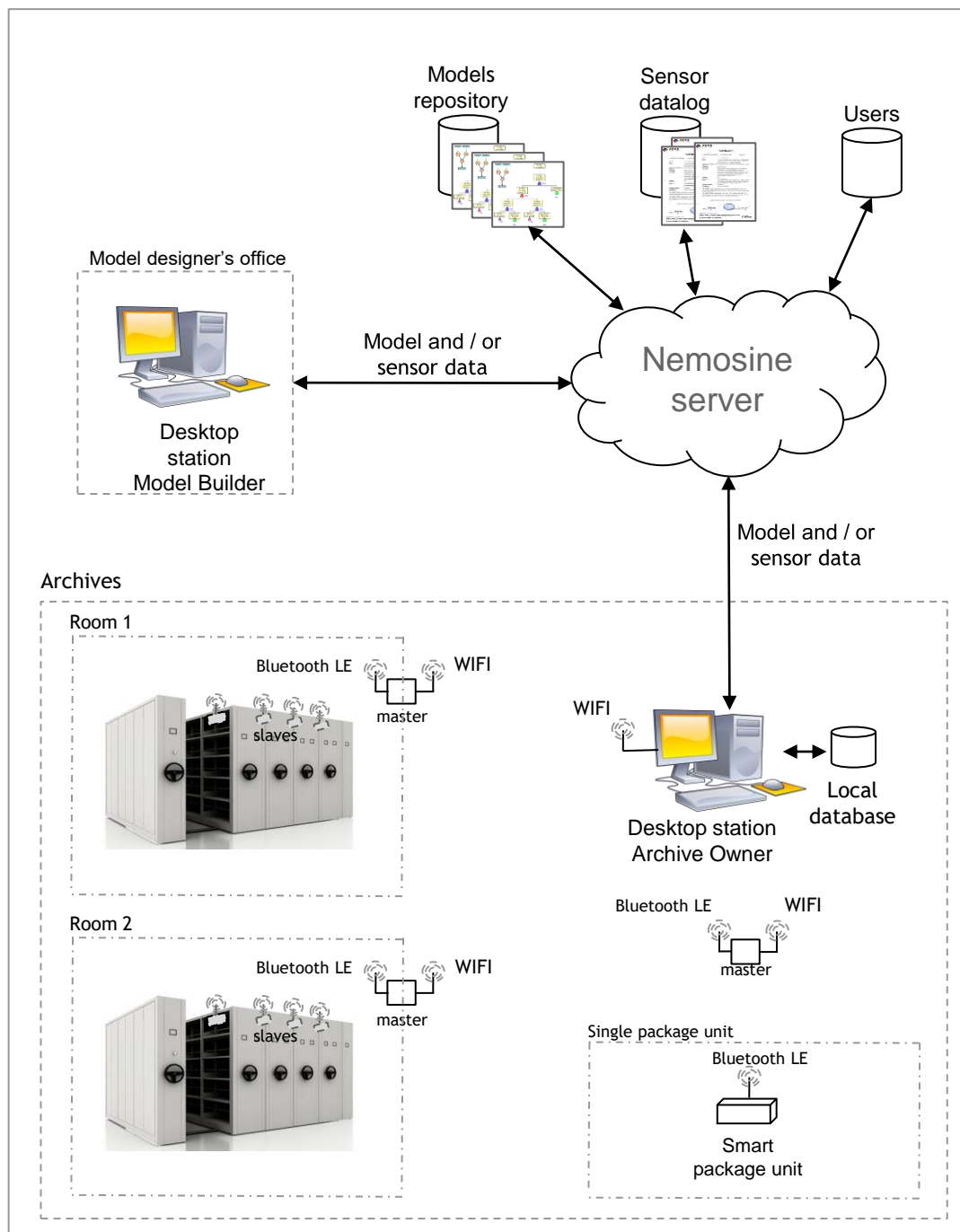
Where **Software embedding predictive models** warn conservators about CH film degradation stages and the actions required for its preservation

These are the partial objectives:

- **Development of a WSN** focussing on low-power **RFID** technologies for monitoring CH artefacts
- **Development of a software platform** to display results and information gathered from sensors attached to CH packages
- Inform conservators about **Nitrate** and **Acetate** film degradation stages based on predictions from dedicated models



Architecture





Smart package unit in connection mode





Connecting Node to software





Measurement Preparations



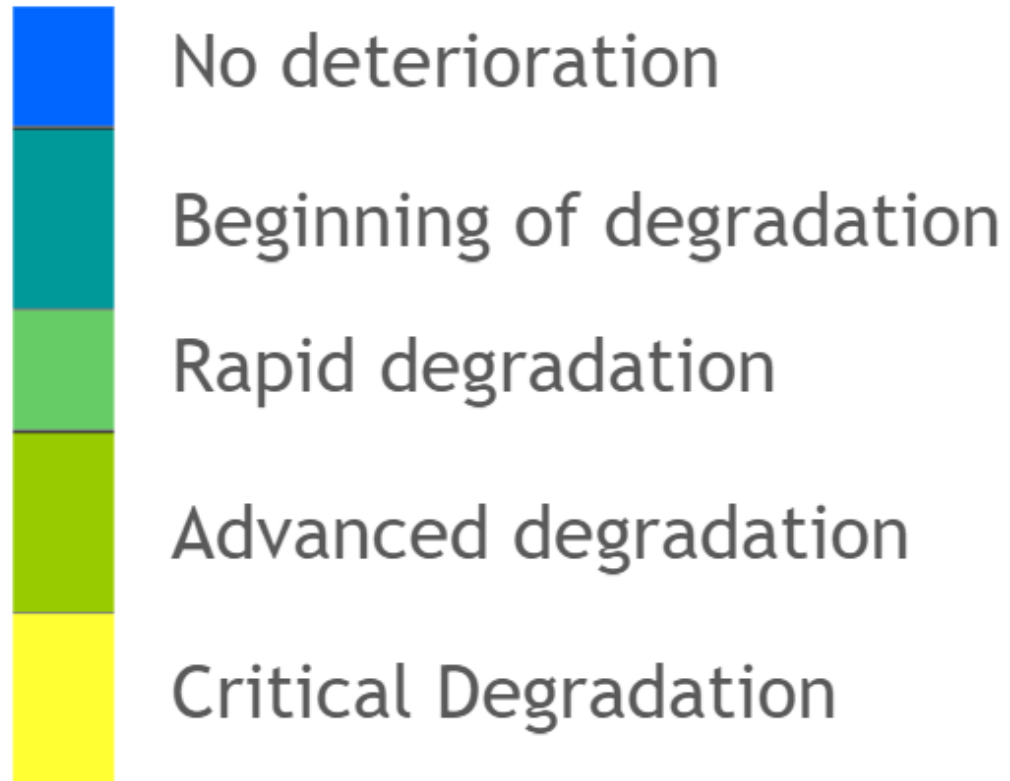


Wait for gas to diffuse inside Node





Degradation color relation





Critical degradation stage film example







RH and Temperature display







Cloud application



EMAIL

PASSWORD



LOGIN




Cloud application

jruiz_mmaker@iris-eng.com 

Measurements download


Note: for convenience, change the extension of the downloaded file to ".csv".

 [DOWNLOAD MEASUREMENTS](#)

Model Upload

Drag and drop file
here

or





 [Browse for file](#)



Cloud application

jruiz@iris-eng.com 



 CLOUD KEY	 CLIENT KEY		
958de166e4bf1f1a9b6a6fe8e69615e8		<input checked="" type="checkbox"/>	
 ADD ARCHIVE		Add new ARCHIVE to generate CLOUD and CLIENT KEYS in order to be able to log into the platform.	



Desktop application

A screenshot of a desktop application window with a dark blue background. The window has a title bar with standard minimize, maximize, and close buttons. In the center, there is a login form. At the top of the form is an icon of a computer monitor displaying the NEMO SINE logo. Below the icon are two white input fields. The first field is labeled 'USER' and the second is labeled 'PASSWORD'. Below these fields is a yellow button with the text 'LOGIN' in black.

USER

PASSWORD

LOGIN




Desktop application

CLOUD

ROOMS

LOGOUT



Cloud Access

CLOUD KEY

LOGIN



Desktop application

CLOUD

ROOMS

LOGOUT

ROOM LIST

ROOM 1

ROOM 2

ROOM 3

ROOM 4

ROOM 5

ROOM 6

DEMO ROOM 1

ROOM 1

SIZE(cms) Width 1000 Length 1000 Height 300

NODE LOCATION LIST

SPU 1

Shelf 1

SIZE(cms) Width 100 Length 150 Height 200

Films 2 Node node2

SPU SPU 1
Films: 1

Node: ☐

SHELF Shelf 1
Films: 2

Node: ☐



Desktop application

ine

MEDIA UPLOAD

LOGOUT

Search

ID NUMBER	MEDIA TYPE	YEAR	CONDITION					ROOM	LOCATION
1	Film	1966	NOx -	AA 200 ppm	T° 18.5 °C	-	-	ROOM 1	SPU 1
2	Video (tape)	1970	NOx -	AA 200 ppm	T° 18.5 °C	-	-	ROOM 1	Shelf 1
3	Film	1970	NOx -	AA 200 ppm	T° 18.5 °C	-	-	ROOM 1	Shelf 1
4	Film	2021	NOx -	AA -	T° -	-	-	-	-
5	Film	1961	NOx -	AA -	T° -	-	-	-	-
6	Film	2021	NOx -	AA -	T° -	-	-	-	-
7	Film	2021	NOx -	AA -	T° -	-	-	-	-
8	Film	2021	NOx -	AA -	T° -	-	-	-	-
9	Film	2021	NOx -	AA -	T° -	-	-	-	-
10	Film	2021	NOx -	AA -	T° -	-	-	-	-
11	Film	2021	NOx -	AA -	T° -	-	-	-	-
12	Film	2021	NOx -	AA -	T° -	-	-	-	-
13	Film	2021	NOx -	AA -	T° -	-	-	-	-
14	Film	2021	NOx -	AA -	T° -	-	-	-	-
15	Film	2021	NOx -	AA -	T° -	-	-	-	-
16	Film	2021	NOx -	AA -	T° -	-	-	-	-
17	Film	2021	NOx -	AA -	T° -	-	-	-	-
18	Film	2021	NOx -	AA -	T° -	-	-	-	-
19	Film	2021	NOx -	AA -	T° -	-	-	-	-
20	Film	2021	NOx -	AA -	T° -	-	-	-	-

Showing 0-19 of 56 items





Desktop application

MEDIA **UPLOAD** **LOGOUT**

Prediction

CURATOR

ARCHIVE FILM No.

STATUS COPY No.

REVISION

00:00:00 23-09-2021 00:00:00 25-09-2021 00:00:00 27-09-2021

IDENTIFICATION

TITLE

ID.NUMBER LOCATION

CARRIER

TYPE SPECIFIC

ELEMENT TYPE

TYPE UNITS

EXTENT STATUS

SOUND

TYPE FIXATION

SYSTEM STATUS

SPECIFICATIONS

COMPANY YEAR

COLOUR STANDARD

CONDITION

CONDITION SURFACE

IMAGE DECOMPO.

SHRINKAGE LAST DATE

RELATIONSHIP

EVENTS

OTHER RELATIONSHIP

SENSOR

DATE RECORD 2021/09/27 12:36:14

NO ₂	- ppm	STAGE	Fresh Film
ACETIC ACID	200.00 ppm	STAGE	Increasing Degr.
TEMP	18.5 °C	RH	30%

NO₂

LEVEL - ppm

CLASSIFICATION Fresh Film

ACETIC ACID

LEVEL 200.00 ppm

CLASSIFICATION Increasing Degradation

ROOM

ID	ROOM 1	STATUS	OnLine
TEMPERATURE	18.5°C		
RH	30%		

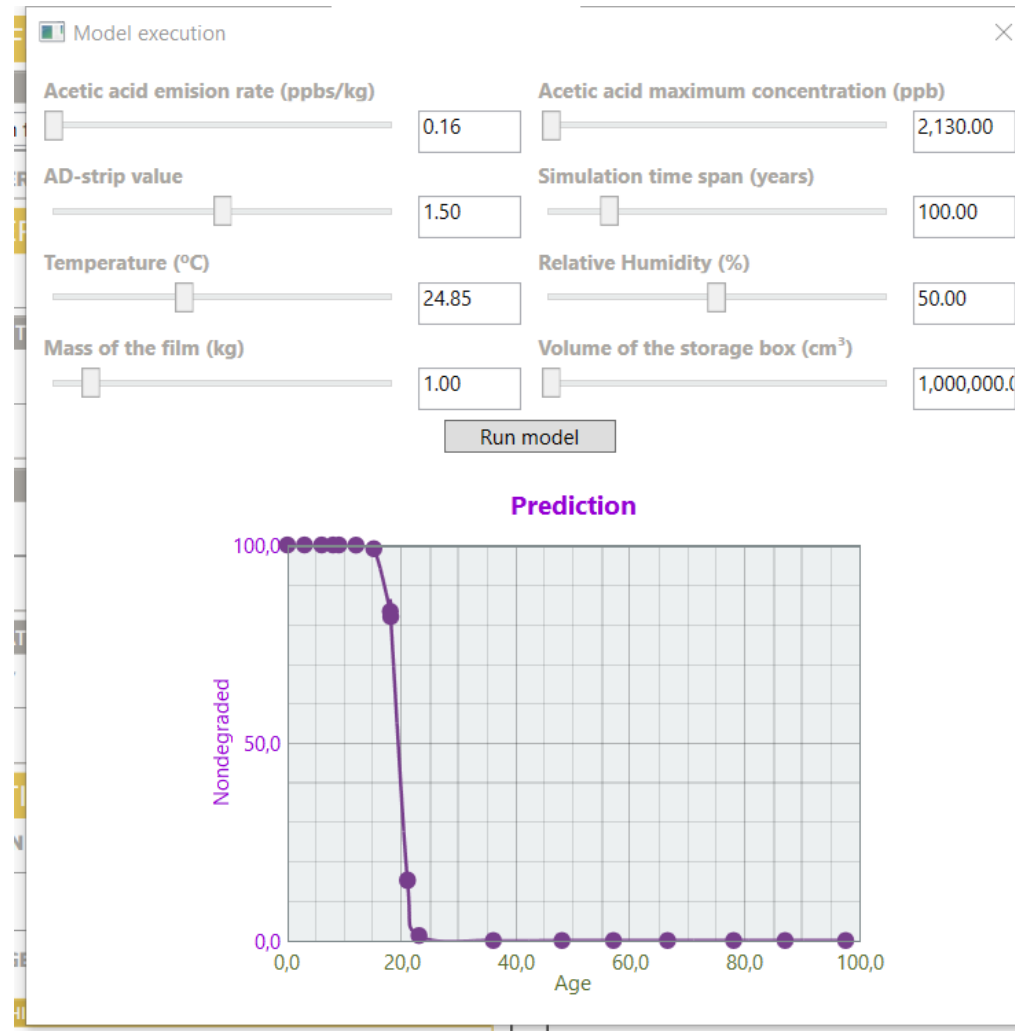
ROOM 1

SPU SPU 1
Films: 1 Node: ☐

SHELF Shelf 1
Films: 2 Node: ☐



Desktop application





SPECIAL THANKS



Javier Carmona Gimeno
Head of IRIS Laboratory



DFF – Deutsches Filminstitut &
Filmmuseum



L'Institut Valencià de Cultura (IVC)



The Austrian Academy of Sciences
(ÖAW)



Thanks for your attention

Jose Luis Angulo jlangulo@iris-eng.com

Jose Javier Ruiz jruiz@iris-eng.com



GA760801 funded by

