

3D PRINTING SPARE PARTS ON-BOARD



WAREHOUSE CONTAINS 300.000 PARTS IN TOTAL



EQUALS 1.400.000 KG OF STORED MATERIALS



WITH AN AVERAGE VALUE OF 13.000.000 US\$

WHY?

"WE ACT SUSTAINABLY BECAUSE WE WANT TO, NOT BECAUSE WE HAVE TO"



CURRENTLY OCCURRING PROBLEMS



DELIVERY TIME

"GETTING A PART ON-BOARD CAN TAKE **WEEKS OR MONTHS**" - HANS HAVERMANS



STOPPING PROJECT

STOPPING A PROJECT BECAUSE OF A MISSING PART COSTS HEEREMA **1 MILLION \$** PER DAY



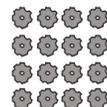
AIR FREIGHTS

ALL AIR FREIGHTS OF ONE VESSEL COSTED **93.240\$** IN 2011



OLD PARTS NO MANUFACTURE

PARTS THAT ARE STILL NEEDED ON-BOARD ARE NOT PRODUCED ANYMORE



PURCHASE PACKAGES

ONLY ONE PART MIGHT BE NEEDED, BUT THE ARE SELLED BY **50 OR 100 UNITS**



AMOUNT IN-STOCK

WITH THE GROWING AMOUNT OF PARTS IN-STOCK, **OVERVIEW GETS LOST**



ADMIN

INFOR SYSTEM TAKES UP A LOT OF TIME OF THE USERS

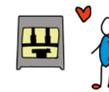


ORDERING PROCESS

AMOUNT OF STEPS TAKEN BEFORE ORDERING CAN TAKE UP **3-5 WEEKS**

HOW?

THE 3D PRINT ROADMAP OF HEEREMA

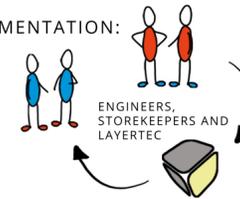


1 RESEARCH PHASE NOW



INTRODUCED TO SMOOTHEN THE IMPLEMENTATION:

- FOLLOW-UP ON RECOMMENDATIONS.
- INVOLVE STAKEHOLDERS.
- EDUCATE USERS OF PRINTER.



2A PLASTIC PRINTING PHASE Q4 2020



INSTALLATION IN THE WAREHOUSE ON-BOARD THE THIALF



BASED ON THE STEPWISE APPROACH OF INNOVATION (HUIZINGH, 2009), PLASTIC PARTS WILL BE PRINTED FIRST:

- USING THE ULTIMAKER S5, A FUSED DEPOSITION MODELLING PRINTER.
- PRINTING NON-CRITICAL PLASTIC PARTS.

2B METAL PRINTING PHASE Q2 2021



THE NEXT STEP ACCORDING THE STEPWISE APPROACH IS PRINTING METAL PARTS:

- USING THE DESKTOP METAL STUDIO SYSTEM, A PRINTER USING THE BOUND METAL DEPOSITION TECHNOLOGY.
- START PRINTING NON-CRITICAL METAL PARTS.
- CONTINUE PRINTING CERTIFIED PARTS IN COLLABORATION WITH LLOYDS.

3 OPPORTUNITIES PHASE 2021



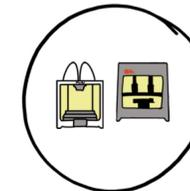
FOLLOWING UP ON OPPORTUNITIES THAT OPEN UP ONCE ADDITIVE MANUFACTURING IS IMPLEMENTED IN HEEREMA'S ORGANIZATION.

MATERIALS: BIO-PLASTICS, HIGH QUALITY PLASTICS, PLASTIC BAKE-OFF
TECHNOLOGY: DIGITAL INVENTORY, TOPOLOGY OPTIMIZATION, WAAM
OTHER: EXPANDING OTHER VESSELS, EXTERNAL FACTORIES, DRONES

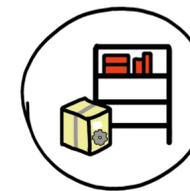
WHY THIS WAY?

SOLUTION ASSESSED ACCORDING THE ASPECTS OF THE INDUSTRIAL DESIGN ENGINEERING DOMAIN:

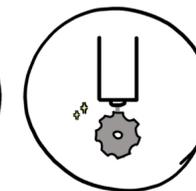
IT IS FEASIBLE



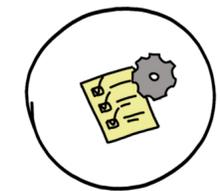
SELECTED HARDWARE PROVEN TO WORK BY PRINT STUDIES



PRINTABLE PARTS SELECTED DURING FIELD STUDY

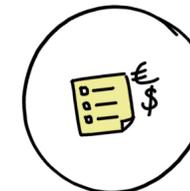


SELECTED PARTS PRINTED DURING PRINT STUDY

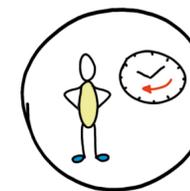


MECHANICAL TESTING SHOWED PROMISING PRINT QUALITY

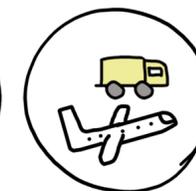
IT IS VIABLE



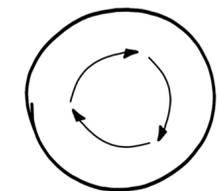
TOTAL INVESTMENT IS 1,8% OF IN-STOCK VALUE



REDUCING MAN-HOURS IN SEVERAL DEPARTMENTS

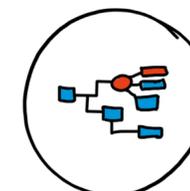


DELIVERY TIME CAN BE DECREASED BY PRINTING ON-BOARD

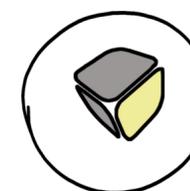


PROCESSES IMPROVE BY REDUCING THE DIFFERENT TYPES OF WASTE

IT IS DESIRABLE



FITS CURRENT PROCESS BY INVOLVING STAKEHOLDERS



LAYERTEC PARTNERSHIP INCLUDES HARDWARE, SOFTWARE AND SERVICE



SAFE FOR USE ACCORDING TO MANUFACTURERS



FIT SUSTAINABILITY AIMS HEEREMA