Technical Expertise Oberpfaffenhofen: DLR

INTRODUCTION

At DLR site Oberpfaffenhofen about 1700 employees work in the areas mission operations for manned and unmanned spaceflight activities including GALILEO, remote sensing, high frequency and radar technologies, atmospheric physics, communications, navigation, robotics and mechatronics.

DLR Department Technology Marketing is present at all DLR sites in Germany screening and evaluating research competences and results of more than 30 institutes. Together with the scientists we develop ideas for new products and services which may have potentials for a new business to be a basis for start-ups.

DLR will increase the opportunities to create new spin-offs by getting ideas for new products from several space related research institutions spread all over Germany. This will demonstrate the social and economical benefits from manned and unmanned spaceflight and space research activities.

OVERVIEW

DLR cross-functional core competencies as drivers to the market

Technical domains
- High performance materials and structures
- Coatings
- Robotics and Mechatronics
- Commercial satellite applications
- Intelligent traffics systems and driver assistance
- Simulation, analysis and detection methods
- Energy transformation and combustion
- Solar systems, layout and dimensioning
- Cooling systems
- Acoustics
- Optical systems

DLR technical expertise for the product generation process

Steps to realization
- Applied Research
- Specification
- Prototyping
- Verification, Simulation and Testing
- Product Development and Design
- Deployment

DLR Oberpfaffenhofen site core activities

Technical Domains	mark core fields of interest
Remote Sensing Technology	
- Algorithms and processors for SAR (Synthetic Aperture Radar) - Generation of Digital Elevation Models (DEM), environmental and traffic monitoring, marine remote sensing - Retrieval of information (image analysis, optical pattern recognition photogrammetry, interpretation of high resolution optical satellite data, 3-dimensional mapping) - Spectrometric sounding of the atmosphere	
Remote Sensing Data Center	
- Research, development and services for airborne and satellite-based earth observation - Reception from data of earth observation satellites from stationary antenna facilities and transportable receiving systems - Long-term archiving in the National Remote Sensing Data Library - Rapid mapping - User services like Center for Satellite based Crisis Information (ZKI) and GeoVisualization Center (GeoVIS) - Acting on behalf of ESA as data and processing center for European and international earth observation missions	
Robotics and Mechatronics	
- Systems and components as intelligent mechanism for aircraft, spaceflight and medicine - Integration of mechanics, electronics and information technology - Interdisciplinary, multi-physical modelling, computer-aided optimisation and simulation - Spaceflight: Development of remote control, partly autonomous robot systems and robonauts for orbital services and exploration - Aeronautics: Design tools for robust flight control systems and energy optimisation - Vehicle technology: Mechtronic concepts, drive-by-wire - 3-dimensional man-machine interfaces	
Communications and Navigation	
- New systems and methods for radio transmission and positioning - Satellite-based communications, broadcasting multimedia contents - Internet connection of satellites, airplanes and remote areas - High-rate data communication between satellite and ground by optical free-space transmission methods - Satellite navigation: Safety-critical applications requiring a reliable positioning and timing information, research in systematic errors and effects of the ionosphere - Verification of GALILEO with a network of worldwide signal data measurement - Development of security critical solutions e.g. for airplane approach and landing phase	

Microwaves and Radar	
- Development and advancement of high resolution radars and microwave radiometer (ground-based, airborne and satellite-based) - Applications in remote sensing, aeronautics, traffic monitoring, reconnaissance and security - Operation, calibration and performance monitoring for satellites (TerraSAR-X, Tandem-X) and experimental airplane E-SAR - Hard- and software for active and passive microwave sensors - Research in radar signatures and microwave propagation	
Atmospheric Physics	
- LIDAR (Light detection and ranging) technologies development, testing - Aeronautics: Climate impact, cloud physical and chemical processes, weather information - Sensor development for trace gases and aerosols	
Flight Operations	
- Flying platforms for scientific research - Environmental and climatic measurement campaigns - Sensor systems for atmospheric data acquisition and calibration	
Space Operations	
- Mission control for German spaceflight programmes - Satellite missions in earth observation and communications - Autonomous navigation and mission planning systems - In-orbit servicing - Mobile high-altitude research rocket-base	

Table 4: DLR Technical Expertise in Oberpfaffenhofen