POSITION DESCRIPTION

Position Title: Senior Mechanical Engineer  
Department: Technical Services (TSD)

Incumbent: Vacant  
FLSA Status: Exempt

Reports To: TSD Sr. Engineer  
Job Code:

Supervises: N/A  
Date: June 23, 2014

SUMMARY:
Under the general supervision of the Technical Services Department (TSD) Senior Engineer, this position provides mechanical engineering and project management leadership to develop new observatory capabilities and upgrade existing observatory systems, through expertise in design, analysis, specification, planning and construction of high technology mechanical and opto-mechanical systems for scientific and high precision applications.

ESSENTIAL FUNCTIONS
• Provide mechanical engineering and systems engineering expertise to support the development of new observatory capabilities and upgrades to existing observatory systems.
• Design and analysis of mechanical and opto-mechanical systems, components and structures using 3D computer aided design (CAD) and finite element analysis (FEA).
• Provide technical and project management oversight of contractor-performed design, fabrication, installation, troubleshooting, repair and testing of observatory systems to assure results meet WMKO specifications.
• Plan and lead the interfacing of new mechanical equipment and instrumentation to existing observatory systems including installation at the summit facility.
• Provide technical leadership and mentoring to engineering and design support staff, encourage and facilitate the development of staff technical skills.
• Follow and maintain observatory standards for mechanical and opto-mechanical systems.
• Prepare and review written documentation and drawings for new systems and modifications to existing systems.
• Maintain commitment to a high standard of safety; comply with all safety laws and WMKO safety policies/rules.
• Drive WMKO vehicles as necessary to transport employees and materials to and from the summit in a safe manner.

Additional Responsibilities
• Perform other duties consistent with the scope of the position.

Required Qualifications:
• Bachelor of Science degree in mechanical engineering.
• Ten years of engineering work experience.
• Proven and documented track record of precision mechanical designs that are in actual use or production.
• Proven and documented track record in managing all aspects of medium to large scale projects, including planning and estimating, executing and reporting, subcontract and subcontractor management, and providing leadership to project teams.
• Engineering process and configuration management experience.

Preferred Qualifications:
• Master’s Degree in Mechanical Engineering.
• Previous experience in an observatory environment with mechanical systems and instrumentation.
• Experience in opto-mechanical design including mounting of optical elements and sensitivity analysis.
• Experience in handling of both medium and large optics (meter-class).
• Experience with field testing for environmental conditions, vibration, and mechanical shock.
• Understanding requirements flow down to design.
• Working knowledge of these specific computer software packages:
  1. SolidWorks and Inventor parametric modelers
  2. Ansys finite element analysis software
  3. Microsoft Project project management and planning software
  4. MathCAD engineering analysis software
  5. ZEMAX optical design software (for mechanical design collaboration, not optical design work)
• Experience with the design and implementation of closed loop motion control systems.
• Experience in the design of cryogenic instrumentation.
• Experience with clean room procedures.
• Experience with computational fluid dynamics.
• Understanding of optical, electronic and software systems.

Skills
• Thorough understanding of mechanical design and analysis, and experience using both hand methods and computer aided modeling for structural design, evaluation of performance over a range of environmental conditions, evaluation of mechanical stability, and evaluation of the effects of vibration and mechanical shock.
• Systems approach to mechanical engineering, with experience in developing error budgets, trade-offs and their impacts to performance of mechanical, optical, software, control electronics, and operations.
• Ability to organize and lead project teams, and to drive projects to completion in a schedule-driven environment.
• Experience with 3D computer aided design, finite element analysis, design for assembly and maintainability, product life cycle management, and reliability engineering.
• Experience with modern manufacturing techniques including multi-axis machining, wire EDM, rapid prototyping, and composite materials.
• Experience using a standard project management software tool such as MS Project.

Certificates and Licenses
• Certificates or licenses are not required.

Competences
To perform the job successfully, an individual should demonstrate the following competencies:
• Communication: Ability to communicate effectively and concisely at all levels.
• Interpersonal skills: Ability to build collaborative, effective relationships with staff.
• Professionalism: Approaches others in a tactful manner; reacts well under pressure; treats others with respect and consideration; accepts responsibility for own actions; follows through on commitments.

Other Requirements
• Willingness to commit to WMKO core values: Safety, Integrity, Respect, Discovery and Service.
• Willingness to commit to WMKO cultural values: Education/Learning, Communication, Teamwork, Rewarding Work Environment, Excellence, Community Involvement.
• Willingness and ability to occasionally work nights and weekends.

Physical Demands
These physical demands are representative of the physical requirements necessary for an employee to successfully perform the essential functions of the job. This is not a complete list of the physical demands that may be required.
• Sitting: Remaining in the seated position.
• Fingering: Picking, pinching, or otherwise working primarily with fingers rather than with the whole hand or arm as in handling.
• Talking: Expressing or exchanging ideas by means of the spoken word to impart oral information to clients or to the public and to convey detailed spoken instructions to other workers accurately, loudly, or quickly.
• Vision: Color vision - Ability to identify and distinguish colors.
• Hearing: Perceiving the nature of sounds at normal speaking levels with or without correction, and having the ability to receive detailed information through oral communication, and making fine discriminations in sound.
• Standing: Remaining on one’s feet in an upright position at a workstation without moving about.
• Walking: Moving about on foot.
• Lifting: Raising or lowering an object from one level to another (includes upward pulling) up to 50 lbs.
• Carrying: Transporting an object, usually holding it in the hands or arms, or on the shoulder.
• Pushing: Exerting force upon an object so that the object moves away from the force (Includes slapping, striking, kicking, and treadle actions).
• Pulling: Exerting force upon an object so that the object moves toward the force (includes jerking).
• Climbing: Ascending or descending ladders, stairs, scaffolding, ramps, poles using feet and legs or hands and arms. Body agility is emphasized.
• Balancing: Maintaining body equilibrium to prevent falling when walking, standing, crouching, or running on narrow, slippery, or erratically moving surfaces.
- **Stooping**: Bending body downward and forward by bending spine at the waist, requiring full use of the lower extremities and back muscles.
- **Handling**: Seizing, holding, grasping, turning, or otherwise working with hand or hands. Fingers are involved only to the extent that they are an extension of the hand, such as to turn a switch or shift automobile gears.
- Ability to pass a high altitude physical.
- Ability to work at the Observatory (14,000 feet elevation).

**Work Environment**
This job operates in a professional office environment. This role may use standard office equipment such as computers, telephones, photocopiers, filing cabinets and fax machines.

**Environmental Conditions**
These environmental conditions are representative of what an employee will encounter while performing the essential functions of the job. This is not a complete list of the environmental conditions that may be encountered.

- **Exposure to weather**: Subject to extreme cold. Temperatures can be below 32 degrees for periods of more than one hour. Consideration should be given to the effect of other environmental conditions such as wind and humidity.
- **Subject to Noise**: There is sufficient noise to cause the worker to shout in order to be heard above the ambient noise level.
- **Subject to Hazards**: Moving mechanical parts.
- **Subject to constrained spaces**: Required to function in narrow aisles or passageways.

The above information on this job description has been designed to indicate the general nature and level of work performed by an employee in this classification. It is not to be interpreted as a comprehensive inventory, or all duties, responsibilities, and qualifications of employees assigned to this job. Management has the right to add to, revise, or delete information in this description. Reasonable accommodations will be made to enable qualified individuals with disabilities to perform the essential functions of this position.