PROJECT MANAGEMENT OF DAG:
EASTERN ANATOLIA OBSERVATORY

DAG Project – Big Picture

0. Astronomy – Astrophysics – Engineering – Research - Development
1. Telescope
2. Enclosure
3. Buildings
4. Infrastructure

B. FPI – Focal Plane Instrumentation 2015:2016-2019
1. AO System
2. Instrumentation (Imaging – Spectroscopy @ VIS & IR)
3. R&D Laboratories

C. MCU – Mirror Coating Unit 2018:2019-2021
1. Mirror Coating (0.4 - 4.0 m)
2. Satellite and Space Tech. Coating

TURKEY’S LARGEST & FIRST VIS + IR TELESCOPE with
LARGEST COATING PLANT CAPACITY
DAG Project Timeline

- **2012:** Acceptance of Project
- **2013:** Personnel, Technical and Infrastructural Foundation
- **2014:** Groundworks, Superstructure and **Telescope Tender (AMOS)**
- **2015:** Project Budget
  - Telescope Design (Optical – Mechanical – Electronics)
  - Mirror Production
  - Site **Master Plan & Building Design Tender (GUNARDA)**
  - **Enclosure Tender (EIE)**
  - Telescope FDR
- **2016:**
  - Enclosure PDR
  - Building FDR
  - Enclosure FDR (July 2016)
  - M1 Blank Acceptance (August 2016)
  - Pier & Buildings Delivery (September 2016)
  - FPI Project Kick Off (August 2016)
  - SLODAR Kick Offf (2016)
- **2019:** DAG (1. Phase) + FPI (2. Phase) = **FIRST LIGHT**
DAG Project & Major Criteria

Atatürk University: Administration, Technical, Financial, Academics Support

Erzurum: Konaklı - Karakaya Summit (2,500 - 3,170 m altitude summits)

Strategy: Latitudinal & Longitudinal observation gap

Opportunities: Multiple telescope locations on site (2500 decares)

Transportation: Main Road, Snowmobile, Cable Car (~35 km - ~35 min.)

Infrastructure: Universiade 2011 – Erzurum (Electricity, Water, Roads, Cable Car)

Support: National Supports (Ministry of Development, Governorship and Municipality of Erzurum; Public Corporations)

Compatibility: Geologically the most stiff rock formation (Basalt)

Atmosphere:
- Clear: Clear Night Count (>250 days)
- Dry: Low Humidity (as low as % 2-10)
- Stable: Weighted Wind Direction (N, NE)
- Cold: Low Temperatures (as low as -35 °C)
- Ideal: Low Inversion Layer (~2600 – 2800 m)
- Clean: No Light – Dust – Smoke – Electromagnetic Pollution
- Consistent: Snow Level and Snow Season (<1.5 m, November - April)
Infrastructure (2012 - 2015):

Allocation: Site (2500 decares).

Buildings:
- ATASAM Building (1000 m²),
- Two Prefabricated (100 m², 40 m²),
- Energy Building & Garage (300 m²),
- DIMM Tower (7 m, 25 m²),
- Underground Water (40 m², 30 tons),
- ATA50 Telescope Building (20 m²).

Surveys:
- Site Geological Survey (2013),
- Drilling Surveys (2012)
- Seismic Instrumentation (2013).

Lines:
- Underground Electricity (3 Phase, 3.5 km) (2014)
- Underground Fiber (48 cores, 100 Gb, 26 km) (2014)
- Radiolink İnternet (25 Mbit, 20 km) (2012).
Infrastructure (2012 - 2015):

**Energy:** 3 Phase MV ve LV Project-Design

**Atmospherical Survey Systems**
(AWOS, Meteosat, Davis, Boltwood)

**Astronomical Observation Systems:**
(All Sky Cam, SQM, SM, MASS-DIMM)

**ATA50 Telescope (2012)**
Infrastructure (2012 - 2015):

**Laboratories:** Main Optical ve Atmospheric Emulation Laboratory (2015)

**Vehicles:** 4x4 Off-road (2), Snowmobile (1), ATV (1), Tracked Personnel Transport & Charge Carrier (1).

**Transportation:**
- Main Road – Snowmobile – Cable Car (2)
- Erzurum Airport– ATAÜNİ: 12 km - Asphalt
- ATAÜNİ– Konaklı Ski Center: 25 km - Asphalt
- Konaklı Ski Center – DAG Site/Summit: 7 km - Stabilized
Telescope AMOS (Belgium)
Enclosure EIE (Italy)

THE DAG TELESCOPE
Primary mirror clear aperture ($D_1$): 4.0 m
Primary mirror focal ratio ($f_1$): 1.8
Configuration: Ritchey-Chretien (RC) $M_1$ and $M_2$ are hyperboloids with conic constants matched to cancel off-axis coma and spherical aberration.
Focal Planes
Effective focal length: 56 m
Operational waveband: 350 to 3000 nm
Unvignetted FOV (diameter): 30 arcmin available at the Nasmyth foci
Primary science FOV: 10 arcmin
Number, location of Nasmyth foci: Two foci, located 4.2 m after $M_3$

Optical Design (In House):
High Performance
$\text{aO} + \text{AO} + \text{RC}$
2 Nasmyth Focus
4 m Diameter
VIS + IR
DAG Building Design  GUNARDA (Turkey)
DAG Current Collaborations

FLAMINGOS-I – Multi-Object NIR Spectrometer (*Univ. of Florida*)

MKIDs – Microwave Kinetic Inductance Detectors (*Univ. of California*)

MASS-DIMM – Installation of DIMM System (*Moscow State Univ.-SAI*)
DAG Collaboration Strategy

• DAG site can host mid/small telescopes within its (2500 decare) area:
  ➢ Use Site – Provide observation time
  ➢ Bring Instrument – Request observation time

• DAG welcomes ALL TYPES of scientific and technical collaborations.
Thanks