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to whom it may concern

### Recommendation for **Georgios Voulgarakis**

In the framework of CERN's Large Hadron collider (LHC) Injector Upgrade project a new linear accelerator (Linac4) is being commissioned. As leader of the development of a novel H<sup>-</sup> ion source for the Linac4, I have the pleasure to collaborate with Georgios Voulgarakis Since April 2015.

Georgios is in charge of engineering a software package - Autopilot - linking ion source hardware, automated operation controls and logging database. To do this, he has developed a framework - Services - that provides the implementation backbone for Autopilot. In Services, existing control systems (InCA, FESA and OASIS) and logging infrastructures (Timber) have been integrated, data visualization and rapid user interface design tools have been integrated and extended (Inspector), allowing for flexible implementation of control algorithms, with high cohesion and loose coupling. The second task he endorsed consist of designing the business logic of Autopilot, thus ensuring optimum operation and highest possible availability of the Linac4 ion source by parameter survey, analysing the data characterizing each plasma and ion pulse dynamics over extended periods, identifying trends or failure modes and generate warnings, alarms and operation's statistics. His contribution provides reliable and automatized control and diagnostics to operate the H<sup>-</sup> source as injector into CERN's accelerators.

Georgios communicates effectively with CERN's timing, control and operations teams and proposes algorithms to ion source specialists that match the required objectives. Georgios Voulgarakis automatized measurement routines and preventive maintenance sequences. He presents his results at regular meetings and negative ion source symposia and actively participates to meetings held in French or English. His software package is now part of the standards of the operation team.

As a summary, Georgios Voulgarakis swiftly adapted to a new professional environment, his work provided insightful and efficient controls and operation tools; Georgios worked well beyond standard and made an outstanding contribution within the ion source team; therefore, I would like to give my utmost recommendation for any position requiring dedication, team spirit and creative response to challenging specification. It is a real pleasure to collaborate with Georgios and I wish him the best for his career.

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Jacques Lettry